FLORIDA POWER and LIGHT COMPANY
NUCLEAR ENERGY SERVICES
700 Universe Boulevard
Juno Beach, Florida 33408

FIRST TEN-YEAR INSERVICE INSPECTION INTERVAL INSERVICE TESTING PROGRAM

FOR

PUMPS AND VALVES

ST. LUCIE NUCLEAR POWER PLANT
UNIT NO. 2

DATE OF COMMERCIAL OPERATION: AUGUST 8, 1983

FLORIDA POWER & LIGHT
P.O. BOX 128
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ST. LUCIE PLANT REVIEWS AND APPROVALS:

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PSL PLANT IST ENGINEER
DATE: 8/11/92

APPROVED BY: [signature]
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DATE: 8/11/92

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RECORD OF REVISIONS

REVISION NUMBER	DESCRIPTION OF REVISION REASON FOR THE CHANGE	DATE REVISED	APPROVALS
0	Initial 10 year submittal	08/08/83	
1	Program Update	01/30/87	
2	Program Update for Generic Letter 89-04	08/01/92	

INSERVICE TESTING (IST) PROGRAM PLAN
ST. LUCIE UNIT 2

1.0 INTRODUCTION

Revision 2 of the St. Lucie Unit 2 ASME Inservice Inspection (IST) Program will be in effect through the end of the first 120-month (10-year) interval unless revised and reissued for reasons other than the routine update required at the start of the second interval per 10 CFR 50.55a(g). The first inspection interval is defined as follows:

Begins	Ends
August 8, 1983	August 8, 1993

This document outlines the IST Program for St. Lucie Plant, Unit 2, based on the requirements of Section XI of the ASME Boiler and Pressure Vessel Code, 1980 Edition, including all addenda thereto through Winter, 1980 (the Code). References in this document to "IWP" or "IWV" correspond to Subsections IWP and IWV, respectively, of the ASME Section XI, 1980 Edition, unless otherwise noted.

The inservice testing identified in this Plan are to be performed specifically to verify the operational readiness of pumps and valves which have a specific function in mitigating the consequences of an accident or in bringing the reactor to a safe shutdown.

[illegible] [illegible]

[illegible]

2.0 APPLICABLE DOCUMENTS

This Program Plan was developed per the requirements and guidance provided by the following documents:

2.1 Title 10, Code of Federal Regulations, Part 50
2.2 NRC Regulatory Guides - Division 1
2.3 Standard Review Plan 3.9.6, "Inservice Testing of Pumps and Valves
2.4 Final Safety Analysis Report, St. Lucie Unit 2
2.5 St. Lucie Plant Unit 2 Technical Specifications
2.6 ASME Boiler and Pressure Vessel Code, Section XI, 1980 Edition and Addenda through Winter, 1980
2.7 NRC Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs"
2.8 Minutes of the Public Meetings on Generic Letter 89-04
2.9 St. Lucie Unit 1 - Interim Relief From the Inservice Testing Program for Pumps and Valves (TAC No. 74794)
2.10 Supplement to Minutes of the Public Meetings on Generic Letter 89-04 by J. G. Partlow, 26 September 1991
2.11 Request for Industry/NRC-Accepted Interpretation on "Practical" as Applied by ASME Code Section XI, IWV-3412(a) by Martin J. Virgilio, Assistant Director for Regions IV and V.
2.12 St. Lucie Unit 2 - Inservice Testing (IST) Program Relief Request, 5 December 1991

3.0 INSERVICE TESTING PROGRAM FOR PUMPS

3.1 Code Compliance

This IST Program for pumps meets the requirements of Subsection IWP of the Code and any interpretations or additional requirements imposed by Generic Letter 89-04. Where these requirements have been determined to be impractical, conformance would cause unreasonable hardship without any compensating increase in safety, or an alternative test provides an acceptable level of quality and safety, relief from Code requirements is requested pursuant to the requirements of 10 CFR 50.55a(g)(5)(iii) and Generic Letter 89-04.

3.2 Allowable Ranges of Test Quantities

The allowable ranges for test parameters as specified in Table IWP-3100-2 will be used for all measurements of pressure, flow, and vibration except as provided for in specific relief requests. In some cases the performance of a pump may be adequate to fulfill its safety function even though there may be a value of an operating parameter that falls outside the allowable ranges as set forth in Table IWP-3100-2. Should such a situation arise, an expanded allowable may be determined, on a case-by-case basis, in accordance with IWP-3210 and ASME Code Interpretation XI-1-79-19.

3.3 Testing Intervals

The test frequency for pumps included in the Program will be as set forth in IWP-3400 and related relief requests. A band of +25 percent of the test interval may be applied to a test schedule as allowed by the St. Lucie Unit 2 Technical Specifications to provide for operational flexibility.

3.4 Pump Program Table

Appendix A lists those pumps included in the IST Program with references to parameters to be measured and applicable requests for relief.

3.5 Relief Requests for Pump Testing

Appendix B includes all relief requests related to pump testing.

4.0 INSERVICE TESTING PROGRAM FOR VALVES

4.1 Code Compliance

This IST Program for valves meets the requirements of Subsection IWV of the Code and any interpretations or additional requirements imposed by Generic Letter 89-04. Where these requirements have been determined to be impractical, conformance would cause unreasonable hardship without any compensating increase in safety, or an alternative test provides an acceptable level of quality and safety, relief from Code requirements is requested pursuant to the requirements of 10 CFR 50.55a(g)(5)(iii) and Generic Letter 89-04.

4.2 Testing Intervals

The test frequency for valves included in the Program will be as set forth in IWP-3400 and related relief requests. A band of +25 percent of the test interval may be applied to a test schedule as allowed by the St. Lucie Unit 2 Technical Specifications to provide for operational flexibility. Where quarterly testing of valves is impractical or otherwise undesirable, testing may be performed during cold shutdown periods as permitted by IWV-3412(a). Justifications for this deferred testing are provided in Appendix E.

4.3 Stroke Time Acceptance Criteria

When required, the acceptance criteria for the stroke times of power-operated valves will be as set forth in Generic Letter 89-04.

4.4 Check Valve Testing

Full-stroke exercising of check valves to the open position using system flow requires that a test be performed whereby the predicted full accident condition flow rate through the valve be verified and measured. Any deviation to this requirement must satisfy the requirements of Generic Letter 89-04, Position 1.

4.5 Valve Program Table

Appendix C lists those valves included in the IST Program with references to required testing, respective test intervals, and applicable requests for relief.

4.6 Relief Requests for Valve Testing

Appendix D includes all relief requests related to valve testing.

Appendix A

Pump Program Tables

[illegible]

PUMP NUMBER	DESCRIPTION	CL	COORD	SPEED	INLET PRES.	DIFF. PRES.	FLOW RATE	VIBRA.	BEARING TEMP.	REMARKS
AFW 2A	AUXILIARY FEEDWATER PUMP	3	N-13	NA	Y	Y	Y:PR-4	Y	N:PR-1	
AFW 2B	AUXILIARY FEEDWATER PUMP	3	M-13	NA	Y	Y	Y:PR-4	Y	N:PR-1	
AFW 2C	AUXILIARY FEEDWATER PUMP	3	K-13	Y	Y	Y	Y:PR-4	Y	N:PR-1	
BAM 2A	BORIC ACID MAKEUP PUMP	2	B-5	NA	Y:PR-8	Y	Y:PR-5	Y	N:PR-1	
BAM 2B	BORIC ACID MAKEUP PUMP	2	C-5	NA	Y:PR-8	Y	Y:PR-5	Y	N:PR-1	
CCW 2A	COMPONENT COOLING WATER PUMP	3	F-16	NA	Y	Y	Y	Y	N:PR-1	
CCW 2B	COMPONENT COOLING WATER PUMP	3	F-17	NA	Y	Y	Y	Y	N:PR-1	
CCW 2C	COMPONENT COOLING WATER PUMP	3	F-16	NA	Y	Y	Y	Y	N:PR-1	
CHG 2A	CHARGING PUMP	2	C-3	NA	Y	Y	Y	Y:PR-12	N:PR-1	
CHG 2B	CHARGING PUMP	2	E-3	NA	Y	Y	Y	Y:PR-12	N:PR-1	
CHG 2C	CHARGING PUMP	2	G-3	NA	Y	Y	Y	Y:PR-12	N:PR-1	
CS 2A	CONTAINMENT SPRAY PUMP	2	G-4	NA	Y:PR-15	Y	Y:PR-6	Y	N:PR-1	
CS 2B	CONTAINMENT SPRAY PUMP	2	H-4	NA	Y:PR-15	Y	Y:PR-6	Y	N:PR-1	
DOT 2A	DIESEL OIL TRANSFER PUMP	3	J-12	NA	Y:PR-16	Y	Y:PR-7	Y	N:PR-1	
DOT 2B	DIESEL OIL TRANSFER PUMP	3	L-12	NA	Y:PR-16	Y	Y:PR-7	Y	N:PR-1	
HPSI 2A	HI PRESS SAFETY INJECTION PUMP	2	D-6	NA	Y:PR-15	Y	Y:PR-9	Y	N:PR-1	
HPSI 2B	HI PRESS SAFETY INJECTION PUMP	2	B-6	NA	Y:PR-15	Y	Y:PR-9	Y	N:PR-1	
HYD 2A	HYDRAZINE PUMPS	2	C-11	Y	N:PR-17	N:PR-17	Y:PR-17	Y:PR-14	N:PR-1	
HYD 2B	HYDRAZINE PUMPS	2	D-11	Y	N:PR-17	N:PR-17	Y:PR-17	Y:PR-14	N:PR-1	
ICW 2A	INTAKE COOLING WATER PUMP	3	H-4	NA	Y:PR-11	Y	Y	Y:PR-13	N:PR-1	
ICW 2B	INTAKE COOLING WATER PUMP	3	H-7	NA	Y:PR-11	Y	Y	Y:PR-13	N:PR-1	
ICW 2C	INTAKE COOLING WATER PUMP	3	H-5	NA	Y:PR-11	Y	Y	Y:PR-13	N:PR-1	
LPSI 2A	LO PRESS SAFETY INJECTION PUMP	2	E-6	NA	Y:PR-15	Y	Y:PR-10	Y	N:PR-1	
LPSI 2B	LO PRESS SAFETY INJECTION PUMP	2	D-6	NA	Y:PR-15	Y	Y:PR-10	Y	N:PR-1	

LEGEND

PUMP NUMBER	Numerical designator indicated on the respective flow diagram.
DESCRIPTION	Generic name/function of the pump.
CL	ISI Classification per the associated ISI boundary drawing(s)
COORD	Corresponds to the flow diagram coordinates of the pump.
Test Parameters	The table indicates by a "Y" (yes) or "N" (no) that the specific parameter is measured, evaluated, and recorded per the applicable Code requirement. If a "N" is indicated, the associated relief request number is also noted in the same column.
PR-XX	Where indicated this refers to the specific relief request (See Appendix B) related to any deviation regarding the measurement or analysis of a parameter.

Appendix B

Pump Program
Relief Requests

[illegible]

RELIEF REQUEST NO. PR-1

COMPONENTS:

All pumps in the Program

SECTION XI REQUIREMENT:

The temperature of all centrifugal pump bearings outside the main flow path and of the main shaft bearings of reciprocating pumps shall be measured at points selected to be responsive to changes in the temperature of the bearings. (IWP-3300, 4310)

BASIS FOR RELIEF:

The data associated with bearing temperatures taken at one-year intervals provides little statistical basis for determining the incremental degradation of a bearing or any meaningful trending information or correlation.

In many cases the pump bearings are water-cooled and thus, bearing temperature is a function of the temperature of the cooling medium, which can vary considerably.

Vibration measurements are a significantly more reliable indication of pump bearing degradation than are temperature measurements. All pumps in the program are subjected to vibration measurements in accordance with IWP-4500.

Although excessive bearing temperature is an indication of an imminent or existing bearing failure, it is highly unlikely that such a condition would go unnoticed during routine surveillance testing since it would manifest itself in other obvious indications such as audible noise, unusual vibration, increased motor current, etc.

Any potential gain from taking bearing measurements, which in most cases would be done locally using portable instrumentation, cannot offset the cost in terms of dilution of operator effort, distraction of operators from other primary duties, excessive operating periods for standby pumps especially under minimum flow conditions, and unnecessary personnel radiation exposure.

[illegible]

[illegible]

[illegible]

[illegible]

RELIEF REQUEST NO. PR-1 (cont.)

BASIS FOR RELIEF (cont.):

Based on the reasons similar to those set forth above, the ASME deleted the requirement for bearing temperature measurements in ASME OM Code, Subsection ISTB, the revised version of the Code for pump testing.

ALTERNATE TESTING:

None.

[illegible]

[illegible]

[illegible]

RELIEF REQUEST NO. PR-2

COMPONENTS:

Various

SECTION XI REQUIREMENT:

The full-scale range of each instrument shall be three times the reference value or less. (IWP-4120)

BASIS FOR RELIEF:

Table IWP-4110-1 requires the accuracy of instruments used to measure temperature and speed to be equal to or better than ±5 percent for temperature and ±2 percent for speed, both based on the full scale reading of the instrument. This means that the accuracy of the measurement can vary as much as ±15 percent and ±6 percent, respectively, assuming the range of the instruments extended to the allowed maximum.

These IST pump parameters are often measured with portable test instruments where commercially available instruments do not necessarily conform to the Code requirements for range. In these cases, high quality calibrated instruments will be used where the "reading" accuracy is at least equal to the Code-requirement for full-scale accuracy. This will ensure that the measurements are always more accurate than the accuracy as determined by combining the requirements of Table IWP-4110-1 and Paragraph IWP-4120.

ALTERNATE TESTING:

Whenever portable instruments are used for measuring pump speed or bearing temperatures, the instruments will be such that the "reading" accuracy is as follows

Temperature	±5 percent
Speed	±2 percent

[illegible]

[illegible]

RELIEF REQUEST NO. PR-3

COMPONENTS:

Applicable to all pumps in the Program

SECTION XI REQUIREMENT:

Each inservice test shall include the measurement and observation of all quantities in Table IWP-3100-1. (IWP-3300)

Pump inlet pressure shall be measured before starting a pump and during the test. (Table IWP-3100-1)

BASIS FOR RELIEF:

If the pumps being tested are in operation as a result of plant or system needs, it is unreasonable to reconfigure system lineups simply to provide for measurement of static inlet pressure.

Inlet pressure prior to pump startup is not a significant parameter needed for evaluating pump performance or its material condition.

ALTERNATE TESTING:

When performing a test on a pump that is already in operation due to system or plant requirements, inlet pressure will only be measured during pump operation.

[illegible]

[illegible]

RELIEF REQUEST NO. PR-4

COMPONENTS:

Auxiliary Feedwater (AFW) Pumps 2A thru 2C
(2998-G-080, Sh 2)

SECTION XI REQUIREMENT:

Each inservice test shall include the measurement and observation of all quantities in Table IWP-3100-1. (IWP-3300)

Pump flow rate shall be measured during the test. (Table IWP-3100-1)

BASIS FOR RELIEF:

There are only two practical flow paths available for performing inservice testing of the AFW Pumps. These include the primary flow path into the main feed supply lines and thence to the steam generator, and the minimum-flow recirculation (mini-recirc and bypass test loop) which returns to the condensate storage tank. The former is provided with flow rate measuring instrumentation however the mini-recirc line is a fixed resistance circuit with no flow instrumentation.

Pumping from the auxiliary feedwater system into the steam generators during plant hot operation is impractical and undesirable for the following reasons:

* During auxiliary feedwater injection via the main feedwater lines while the plant is operating at power, a large temperature differential (approximately 375 deg-F) could exist that would result in significant thermal shock and fatigue cycling of the feedwater piping and steam generator nozzles.

* Based on the expected duration of the testing and the flow rate of the pumps (150 to 200 gpm), it is expected that the cooldown of the steam generator would induce cooldown and contraction of the reactor coolant system resulting in undesirable reactivity variations and power fluctuations.

[illegible]

[illegible]

[illegible]

RELIEF REQUEST NO. PR-4 (cont.)

ALTERNATE TESTING:

During quarterly testing of the AFW pumps while the pumps are operating through the fixed-resistance mini-recirc line, pump differential pressure and vibration will be measured and evaluated per IWP-3200 and IWP-6000.

During testing performed at cold shutdown, pump differential pressure, flow rate, and vibration will be recorded per IWP-3200 and IWP-6000. Testing during cold shutdowns will be on a frequency determined by intervals between shutdowns as follows:

For intervals of 3 months or longer - each shutdown.

For intervals of less than 3 months - testing is not required unless 3 months have passed since the last shutdown test.

This alternate testing agrees with the requirements of NRC Generic Letter 89-04, Position 9 and, as such, is considered to be approved upon submittal.

RELIEF REQUEST NO. PR-5

COMPONENTS:

Boric Acid Makeup (BAM) Pumps 2A and 2B
(2998-G-078, Sh 121)

SECTION XI REQUIREMENT:

Each inservice test shall include the measurement and observation of all quantities in Table IWP-3100-1. (IWP-3300)

Pump flow rate shall be measured during the test. (Table IWP-3100-1)

BASIS FOR RELIEF:

There are three practical flow paths available for performing inservice testing of the BAM Pumps. These include the primary flow path into the charging pump suction header, a recirculation line leading back to the refueling water tank, and the minimum-flow recirculation (mini-recirc and bypass test loop) which returns to the BAM Tanks. None of these flow paths is totally satisfactory for the following reasons:

* Operating the BAM Pumps discharging into the charging pump suction header requires the introduction of highly concentrated boric acid solution from the boric acid makeup tanks to the suction of the charging pumps. This, in turn, would result in the addition of excess boron to the RCS. This rapid insertion of negative reactivity would result in a rapid RCS cooldown and depressurization. A large enough boron addition would result in an unscheduled plant trip and a possible initiation of Safety Injection Systems.

* During cold shutdown, the introduction of excess quantities of boric acid into the RCS is undesirable from the aspect of maintaining proper plant chemistry and the inherent difficulties that may be encountered during the subsequent startup due to over-boration of the RCS. The waste management system would be overburdened by the large amounts of RCS coolant that would require processing to decrease its boron concentration.

[illegible]

[illegible]

[illegible]

RELIEF REQUEST NO. PR-5 (cont.)

* The second circuit recirculates water to the Refueling Water Tank (RWT) or the Volume Control Tank (VCT). During normal plant operation at power it is undesirable to pump to the RWT and deplete the BAM Tank inventory. One of the two BAM Tanks is maintained at Tech. Spec. level while the other is used as required for plant operation. The Tech. Spec. BAM Tank cannot be pumped from because it must be maintained at a level near the top of the tank. The other BAM Tank's level will vary from test to test by as much as 15 to 20 feet. This variance in pump suction pressure will have a direct affect on pump head and flow such that test repeatability would be questionable.

* The minimum-flow recirculation flow path is a fixed resistance circuit of one inch pipe containing a flow limiting orifice. No flow rate measuring instrumentation is installed in this line. Pumping boric acid from tank to tank would be possible but the flow rates would be small, limiting pump operation to the high head section of the pump curve. In addition, one of the two BAM Tanks is maintained at Tech. Spec. level while the other is used as required for normal plant operation. The Tech. Spec. BAM Tank cannot be pumped from because it must be maintained at a level near the top of the tank. This narrow band limits the amount that can be pumped to it or from it to only a few hundred gallons. The other BAM Tank's level will vary from test to test by as much as 15 to 20 feet. This variance in pump suction pressure will have a direct affect on pump head and flow such that test repeatability would be questionable.

RELIEF REQUEST NO. PR-5 (cont.)

ALTERNATE TESTING:

During quarterly testing of the BAM pumps, while the pumps are operating through the fixed-resistance mini-recirc line, pump differential pressure and vibration will be measured and evaluated per IWP-3200 and IWP-6000.

During testing performed at each reactor refueling outage, pump differential pressure, flow rate, and vibration will be recorded per IWP-3200 and IWP-6000.

This alternate testing agrees with the requirements of NRC Generic Letter 89-04, Position 9 and, as such, is considered to be approved upon submittal.

RELIEF REQUEST NO. PR-6

COMPONENTS:

Containment Spray (CS) Pumps 2A and 2B (2998-G-088)

SECTION XI REQUIREMENT:

Each inservice test shall include the measurement and observation of all quantities in Table IWP-3100-1. (IWP-3300)

Pump flow rate shall be measured during the test. (Table IWP-3100-1)

BASIS FOR RELIEF:

There are two practical flow paths available for performing inservice testing of the CS Pumps. These include one that pumps borated water from the RWT to the RCS via the low-pressure injection header and the other, minimum-flow recirculation (mini-recirc and bypass test loop) which returns to the RWT

The first would require modifying the shutdown cooling lineup while in cold shutdown; however, the shutdown cooling system cannot provide sufficient letdown flow to the RWT to accommodate full design flow from the RWT while maintaining the necessary core cooling function. Thus, the only practical time for testing these pumps via this flow path is during refueling outages when water from the RWT is used to fill the refueling cavity.

The minimum-flow recirculation flow path is a fixed resistance circuit containing a flow limiting orifice however no flow rate measuring instrumentation is installed.

ALTERNATE TESTING:

The CS pumps are operated through the fixed-resistance mini-recirc line during the quarterly pump testing. Pump differential pressure and vibration are measured and evaluated per IWP-3200 and IWP-6000.

RELIEF REQUEST NO. PR-6 (cont.)

ALTERNATE TESTING:(cont.)

During the pump testing performed each reactor refueling, pump differential pressure, flow rate, and vibration will be recorded per IWP-3200 and IWP-6000.

This alternate testing agrees with the requirements of NRC Generic Letter 89-04, Position 9 and, as such, is considered to be approved upon submittal.

RELIEF REQUEST NO. PR-7

COMPONENTS:

Diesel Fuel Oil Transfer Pumps 2A and 2B (2998-G-086, Sh 1)

SECTION XI REQUIREMENTS:

Flow rate shall be measured using a rate or quantity meter installed in the pump test circuit. (IWP-4600)

The allowable ranges of inservice test quantities in relation to the reference values are tabulated in table IWP-3100-2. (IWP-3210)

BASIS FOR RELIEF:

There are two flow paths available for performing inservice testing on these pumps: the normal day tank fill line and the transfer lines used to transfer fuel oil between diesel oil storage tanks. Neither of these flow paths have installed flow instrumentation.

The day tank would have to be drained to use it as the flow path for a pump flow test. To drain the day tank would require the pump to be disabled and additional diesel generator run time to use up the fuel oil or draining over 200 gallons of fuel oil into 55 gallon drums. Neither draining method is acceptable. Even if the tank could be drained, the length of the pump test would be limited by the small volume of the day tank.

The most practical method of determining pump flow rate is by calculating the transfer rate of fuel oil between storage tanks. The pump flow test is divided into two sections. The pump is recirculated for 15 minutes to its own storage tank (A) for the first section of the flow test. During these 15 minutes, the pump is warmed up and vibration measurements are taken. Prior to the end of the 15 minutes, the pump's discharge valve is throttled to a preset value. The pump is stopped and the valve lineup is changed so that flow is now directed to the other storage tank (B).

RELIEF REQUEST NO PR-7 (cont.)

BASIS FOR RELIEF:

While the pump's lineup is changed, the pump's storage tank (A) level is measured by hand using a tape measure. The pump is then started and allowed to transfer a minimum of 3 inches of fuel oil, 5 to 6 inches is preferred. A final storage tank (A) level is measured at the end of the test. The pump's flow rate is calculated by converting the storage tank (A) level change into a volume change and then dividing it by the number of minutes the pump was run.

ALTERNATIVE TESTING:

During quarterly testing of the Diesel Generator Fuel Oil Transfer Pumps, pump differential pressure, flow rate, and vibration will be recorded per IWP-3200 and IWP-6000. Flow rate will be based on the storage tank level changes over a measured period of pump operation. The allowable ranges for the test parameters as specified in Table IWP-3200-2 will be used for all measurements except for flow. In accordance with IWP-3200 and ASME Interpretation XI-1-79-19, the new pump flow limits and their calculations will be specified in the record of tests (IWP-6000).

A series of at least four flow tests will be performed for each pump to establish a new pump baseline. The calculated average flow rate, F(avg), of these tests will be used for the pump's reference value. The mean error for the individual flow rates and average flow rate will be calculated and combined by the sum of the squares to form a combined error (Sigma). The combined error will then be doubled (two standard deviations) to achieve a 95.4 % accuracy that all acceptable flow rate tests will fall within this range. The new pump limits will be as follows:

Required Action	>	[1.02 x F(avg)] + 2 Sigma
Upper Alert	=	[1.02 x F(avg)] + 2 Sigma
Upper Acceptable	=	[1.00 x F(avg)] + 2 Sigma
Lower Acceptable	=	[0.96 x F(avg)] - 2 Sigma
Lower Alert	=	[0.94 x F(avg)] - 2 Sigma
Required Action	<	[0.94 x F(avg)] - 2 Sigma

The Lower Acceptable limit incorporates a 4 % range for a small amount of pump degradation. This is the same amount that is included in the limits listed in Table IWP-3200-2.

[illegible]

[illegible]

RELIEF REQUEST NO. PR-8

COMPONENTS:

Boric Acid Makeup Pumps 2A and 2B (2998-G-078, Sh 121)

SECTION XI REQUIREMENTS:

Each inservice test shall include the measurement and observation of all quantities in Table IWP-3100-1 except bearing temperatures, which shall be measured during at least one inservice test each year. (IWP-3300)

BASIS FOR RELIEF:

The system installation does not provide any mechanism for measuring pump suction pressures, and thus, the requirement for measuring suction pressure and pump differential pressures cannot be satisfied. A measure of pump suction pressure can, however, be determined by a calculation using the height of liquid in the boric acid makeup tanks. Since there is essentially fixed resistances between the tanks and the pumps this will provide a consistent value for suction pressures.

Since the tank levels are not expected to vary significantly during the tests, tank levels and associated calculations will only be taken once during each test instead of prior to pump operation and during operation as required by Table IWP-3100-1.

ALTERNATE TESTING:

The Boric Acid Makeup Pump suction pressures will be calculated based on the height of liquid in the associated tank once during each inservice test. Subsequently, these calculated values will be used to determine pump differential pressures for evaluation of pump parameters.

RELIEF REQUEST NO. PR-9

COMPONENTS:

- High Pressure Safety Injection (HPSI) Pumps 2A and 2B (2998-G-078, Sh 130)

SECTION XI REQUIREMENT:

Each inservice test shall include the measurement and observation of all quantities in Table IWP-3100-1. (IWP-3300)

BASIS FOR RELIEF:

During quarterly testing of the HPSI Pumps, the pumps cannot develop sufficient discharge pressure to overcome RCS pressure. Flow is routed through a minimum flow test line leading to the RWT. This line has no installed flow rate measuring instrumentation and measuring flow rate during quarterly testing is not practical.

During cold shutdown conditions, full flow operation of the HPSI pumps to the RCS is restricted to preclude RCS system pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.3.

NRC Generic Letter 89-04, Position 9, allows elimination of minimum flow test line flow rate measurements providing inservice tests are performed during cold shutdowns or refueling under full or substantial flow conditions where pump flow rate is recorded and evaluated.

ALTERNATE TESTING:

During quarterly testing of the HPSI Pumps, pump differential pressure and vibration will be recorded per IWP-3200 and IWP-6000.

During testing performed at each reactor refueling, pump differential pressure, flow rate, and vibration will be recorded per IWP-3200 and IWP-6000.

This alternate testing agrees with the guidelines of NRC Generic Letter 89-04, Position 9 and, as such, is considered to be approved upon submittal.

[illegible]

RELIEF REQUEST NO. PR-10

COMPONENTS:

Low Pressure Safety Injection (LPSI) Pumps 2A and 2B (2998-G-078, Sh 131)

SECTION XI REQUIREMENT:

Each inservice test shall include the measurement and observation of all quantities in Table IWP-3100-1. (IWP-3300)

BASIS FOR RELIEF:

During quarterly testing of the LPSI Pumps, the pumps cannot develop sufficient discharge pressure to overcome RCS pressure. Flow is routed through a minimum flow test line leading to the RWT. This line has no installed flow rate measuring instrumentation and measuring flow rate during quarterly testing is not practical.

During cold shutdown, the LPSI pumps are used for residual heat removal. The substantial flow tests can be performed at this time. Pump differential pressure and flow rate will be recorded. However, due to the vibrations induced in the system piping while the Reactor Coolant Pumps are running, pump vibration readings will only be measured during cold shutdowns where the RCPs are secured.

RELIEF REQUEST NO PR-10

ALTERNATE TESTING:

During quarterly testing of the LPSI Pumps, pump differential pressure and vibration will be recorded per IWP-3200 and IWP-6000.

Substantial flow testing will be performed during cold shutdowns. Pump differential pressure, flow rate, and vibration (if RCPs secured) will be recorded per IWP-3200 and IWP-6000. Testing will be on a frequency determined by intervals between shutdowns as follows:

For intervals of 3 months or longer - each shutdown.

For intervals of less than 3 months - testing is not required unless 3 months have passed since the last shutdown test.

RELIEF REQUEST NO. PR-11

COMPONENTS:

Intake Cooling Water Pumps 2A, 2B and 2C (2998-G-082)

SECTION XI REQUIREMENT:

Each inservice test shall include the measurement and observation of all quantities in Table IWP-3100-1. (IWP-3300)

Pump inlet pressure shall be measured before starting a pump and during the test. (Table IWP-3100-1)

BASIS FOR RELIEF:

The pumps listed above are vertical line shaft pumps submerged in the intake structure with no practical means of measuring pump inlet pressure. The inlet pressure, however, can be determined by calculation using, as input, the measured height of water above the pump inlet as measured at the intake.

During each inservice test, the water level in the intake pit remains relatively constant, thus only one measurement of level and the associated suction pressure calculation need be performed.

ALTERNATE TESTING:

During testing of these pumps, one value of inlet pressure will be calculated based on water level at the inlet structure.

RELIEF REQUEST NO. PR-12

COMPONENTS:

Reactor Coolant Charging Pumps 2A, 2B, and 2C

SECTION XI REQUIREMENT:

The frequency response range of the readout system (for instrument used to measure vibration amplitude) shall be from one-half minimum speed to at least maximum pump shaft rotational speed. (IWP-4520(b))

BASIS FOR RELIEF:

The reactor coolant charging pumps operate at approximately 210-215 rpm which equates to a rotational frequency of 3.5 Hz. In accordance with the ASME Code, the frequency response for the vibration instruments would have to be one half of this or 1.75 Hz. Following an extensive investigation of available and potentially suitable instrumentation, it has been determined that instruments satisfying this requirement for the charging pumps are commercially unavailable.

ALTERNATE TESTING:

During testing of these pumps, vibration will be measured as required by IWP-4510, except that the lower frequency response for the instruments will be 10 Hz.

[illegible]

[illegible]

[illegible]

RELIEF REQUEST NO. PR-13

COMPONENTS:

Intake Cooling Water Pumps 2A, 2B, and 2C

SECTION XI REQUIREMENT:

The frequency response range of the readout system (for instrument used to measure vibration amplitude) shall be from one-half minimum speed to at least maximum pump shaft rotational speed. (IWP-4520(b))

BASIS FOR RELIEF:

The St. Lucie Plant has recently completed a major upgrade to its ASME pump vibration program to better comply with the Code. As part of the upgrade, new vibration instruments were purchased. The instruments were chosen for their ease of use and reliability; however, the instrument's lower frequency response does not comply with the Code when used on the Intake Cooling Water pumps. The intake cooling water pumps operate at a shaft speed of approximately 885 rpm. Based on this speed and the Code requirement, the instrumentation used to measure vibration (displacement) would require a response range down to 7.38 hz. The new instruments are capable of a lower frequency response to 10 hz, 2.62 Hz higher than the Code. The impact of procuring instruments along with the accompanying re-training that would be required is clearly unwarranted at this time simply to gain a slightly better frequency response.

ALTERNATE TESTING:

During testing of these pumps, vibration will be measured as required by IWP-4510, except that the lower frequency response for the instruments will be 10 Hz.

[illegible]

[illegible]

[illegible]

RELIEF REQUEST NO. PR-14

COMPONENTS:

Hydrazine Pumps 2A and 2B

SECTION XI REQUIREMENT:

The frequency response range of the readout system (for instrument used to measure vibration amplitude) shall be from one-half minimum speed to at least maximum pump shaft rotational speed. (IWP-4520(b))

BASIS FOR RELIEF:

The hydrazine pumps operate as low as 105 rpms. This equates to a rotational frequency of 1.75 Hz. In accordance with the ASME Code, the frequency response for the vibration instruments would have to be one half of this or 0.875 Hz. Following an extensive investigation of available and potentially suitable instrumentation, it has been determined that instruments satisfying this requirement for the hydrazine pumps are commercially unavailable.

ALTERNATE TESTING:

During testing of these pumps, vibration will be measured as required by IWP-4510, except that the lower frequency response for the instruments will be 10 Hz.

[illegible]

[illegible]

RELIEF REQUEST NO. PR-15

COMPONENTS:

Containment Spray Pumps 2A and 2B (2998-G-088)
Hi Press Safety Inject. Pumps 2A and 2B (2998-G-078 SH 130)
Lo Press Safety Inject. Pumps 2A and 2B (2998-G-078 SH 130)

SECTION XI REQUIREMENTS:

Each inservice test shall include the measurement and observation of all quantities in Table IWP-3100-1 except bearing temperatures, which shall be measured during at least one inservice test each year. (IWP-3300)

BASIS FOR RELIEF:

The system installation does not provide any installed suction gages. A measure of pump suction pressure can, however, be determined by calculation using the height of liquid in the Refueling Water Tank. During the quarterly pump tests, the flow rate through the suction piping is very low, therefore, the amount of head loss is negligible. This is not the case during the substantial flow tests. The flow rates used during these tests would cause a noticeable head loss in the suction piping.

Since the tank levels are not expected to vary significantly during the quarterly tests, tank levels and associated calculations will only be taken once during each quarterly test instead of prior to pump operation and during operation as required by Table IWP-3100-1.

ALTERNATE TESTING:

During the quarterly pump tests, the pumps' suction pressures will be calculated based on the height of liquid in the associated tank. Subsequently, these calculated values will be used to determine pump differential pressures for evaluation of pump parameters.

During the cold shutdown or refueling substantial flow testing of these pumps, temporary suction gages will be installed to measure pump suction pressure.

RELIEF REQUEST NO. PR-16

COMPONENTS:

Diesel Oil Transfer Pumps 2A and 2B (2998-G-086 SH 1)

SECTION XI REQUIREMENTS:

Each inservice test shall include the measurement and observation of all quantities in Table IWP-3100-1 except bearing temperatures, which shall be measured during at least one inservice test each year. (IWP-3300)

BASIS FOR RELIEF:

The system installation does not provide any installed suction gauges . A measure of pump suction pressure can, however, be determined by calculation using the height of liquid in the Diesel Oil Storage Tank. During the quarterly pump tests, the flow rate through the suction piping is very low, therefore, the amount of head loss is negligible.

Since the tank levels are not expected to vary significantly during the quarterly tests, tank levels and associated calculations will only be taken once during each quarterly test instead of prior to pump operation and during operation as required by Table IWP-3100-1.

ALTERNATE TESTING:

During the quarterly pump tests, the pumps' suction pressures will be calculated based on the height of liquid in the associated tank. Subsequently, these calculated values will be used to determine pump differential pressures for evaluation of pump parameters.

[illegible]

[illegible]

RELIEF REQUEST NO. PR-17

COMPONENTS:

Hydrazine Pumps 2A and 2B (2998-G-088)

SECTION XI REQUIREMENTS:

Each inservice test shall include the measurement and observation of all quantities in Table IWP-3100-1 except bearing temperatures, which shall be measured during at least one inservice test each year. (IWP-3300)

Symmetrical damping devices or averaging techniques may be used to reduce instrument fluctuations to within 2% of the observed reading. (IWP-4150)

BASIS FOR RELIEF:

The Hydrazine Pumps are positive displacement pumps with a variable speed drive. They operate at a very low rpm and flow rate (0.71 to 0.82 gpm). The flow instrument orifice is located in the pump's suction line. Its output signal pulsates sharply with each stroke and cannot readily be averaged. The flow recorder for the hydrazine pumps, FR-07-2-2, displays a wide trace for flow rate. The only way to know the true flow rate of the pumps is to collect the pumps output in a container and measure it.

During the 1992 Unit 2 refueling outage, several flow tests per hydrazine pump were performed. The discharge of one pump was directed to a container of a known volume. The amount of time to fill the container was measured and then used to calculate an average flow rate for the pump. Each of the flow tests for each pump were performed at a different pump rpm. A correlation between pump rpm and average flow rate was developed and compared to the expected value. The measured and the expected correlations between rpm and flow rate were in close agreement. The expected correlation was based upon piston diameter, piston stroke, and pump rpm. Based upon these results, hydrazine pump flow rate can be accurately set by selecting the proper pump rpm.

[illegible]

RELIEF REQUEST NO. PR-17 (cont.)

BASIS FOR RELIEF (cont.):

- Frequent performance of the above mentioned flow testing can not be performed. Hydrazine is a highly flammable liquid with cumulative toxic affects when absorbed through the skin, inhaled, or ingested. It has also been identified as a known carcinogen.

ALTERNATE TESTING:

During the quarterly pump tests, each pump's rpm will be measured to verify the required flow rate of 0.71 to 0.82 gpm. Pump flow will be recorded but not alert trended and vibration will be measured during the quarterly tests.

During each refueling outage at least one flow test will be performed for each pump to verify proper performance. Pump vibration will be measured during this flow test.

Appendix C

Valve Program Tables

LEGEND

VALVE NUMBER	The plant alpha-numerical designator for the subject valve
COORD	The coordinate location of the valve on the designated drawing
CL	The ISI Classification of the valve as per the respective ISI boundary drawings
CAT	The valve category per Paragraph IWV-2200
SIZE	The valve's nominal size in inches
TYPE	The valve type
A/P	The active (A) or passive (P) determination for the valve per IWV-2100.
ACT. TYPE	The valve actuator type as follows: AO Air-operated DO Diaphram-operated MO Electric motor-operated MAN Manual valve PO Piston-operated S/A Self-actuated SO Solenoid-operated
NORM POS.	Designates the normal position of the valve during plant operation at power
REM IND	Notes if a valve has remote position indication
FAIL MODE	Identifies the failure mode (open or closed) for a valve. FAI indicates the valve fails "as is".

[illegible]

[illegible]

LEGEND (Cont.)

EXAM — Identifies the test requirements for a valve as follows:

CV/C	Check valve exercise to closed position.
CV/O	Check valve full-stroke exercise to open position.
CV/PO	Check valve partial-stroke exercise to open position.
EC	Exercise to closed position. For all category A or B power-operated valves stroke times will be measured unless excluded by an associated relief request.
EE	Exercise valve to verify proper operation and stroking with no stroke time measurements. Requires observation of system parameters or local observation of valve operation.
EO	Exercise to open position. For all category A or B power-operated valves stroke times will be measured unless excluded by an associated relief request.
FS	Fail safe test
INSP	Disassembly and inspection of check valves
PEC	Partial closure exercise for power-operated valves
PI	Position indication verification
SLT-1	Seat leakrate test per 10 CFR 50, App J
SLT-2	Seat leakrate test for pressure isolation valves.
SLT-3	Seat leakage test of air accumulator check valves.
SRV	Set point check for safety/relief valves

[illegible]

[illegible]

[illegible]

[illegible]

LEGEND (Cont.)

TEST FREQ — The required test interval as follows:

- QR — Quarterly (during plant operation)
- CS — Cold shutdown as defined by Technical Specification
- 2Y — Every 2 years
- RF — Each reactor refueling outage (cycle). In the case where this is designated for safety/relief valves refer, to Table IWV-3510-1.
- SP — Other (See applicable Request for Relief)

RELIEF REQ — Refers to the specific relief request associated with the adjacent test requirement. (See Appendix D)

P & ID: 2998-G-078 SH 107 SYSTEM: REACTOR COOLANT SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-1460	G-6	2	B	1.000	GLOBE	A	SO	LC	YES	FC	EO PI	CS 2Y		
V-1461	G-6	2	B	1.000	GLOBE	A	SO	LC	YES	FC	EO PI	CS 2Y		
V-1462	E-6	2	B	1.000	GLOBE	A	SO	LC	YES	FC	EO PI	CS 2Y		
V-1463	E-6	2	B	1.000	GLOBE	A	SO	LC	YES	FC	EO PI	CS 2Y		
V-1464	D-4	2	B	1.000	GLOBE	A	SO	LC	YES	FC	EO PI	CS 2Y		
V-1465	E-4	2	B	1.000	GLOBE	A	SO	LC	YES	FC	EO PI	CS 2Y		
V-1466	G-5	2	B	1.000	GLOBE	A	SO	LC	YES	FC	EO PI	CS 2Y		

P & ID: 2998-G-078 SH 108 SYSTEM: REACTOR COOLANT SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-1474	F-6	1	B	3.000	GLOBE	A	SO	C	YES	FC	EO PI	CS 2Y		
V-1475	D-6	1	B	3.000	GLOBE	A	SO	C	YES	FC	EO PI	CS 2Y		
V-1476	F-5	1	B	3.000	GATE	A	MO	O	YES	FAI	EC PI	QR 2Y		
V-1477	D-5	1	B	3.000	GATE	A	MO	O	YES	FAI	EC PI	QR 2Y		

P & ID: 2998-G-078 SH 109 SYSTEM: REACTOR COOLANT SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-1200	G-6	1	C	3.000	SAFETY	A	S/A	C	NO		SRV	RF		
V-1201	G-6	1	C	3.000	SAFETY	A	S/A	C	NO		SRV	RF		
V-1202	G-6	1	C	3.000	SAFETY	A	S/A	C	NO		SRV	RF		

小[illegible]

P & ID: 2998-G-078 SH 120 SYSTEM: CHEMICAL AND VOLUME CONTROL

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-2522	E-7	2	A	2.000	GLOBE	A	DO	O	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
											SLT-1	2Y		

P & ID: 2998-G-078 SH 121 SYSTEM: CHEMICAL AND VOLUME CONTROL

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
FCV-2210Y	C-2	2	B	1.000	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
V-2177	C-3	2	C	3.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-5	
											CV/PO	CS		
V-2190	D-6	2	C	3.000	CHECK	A	S/A	C	NO		CV/C	QR		
											CV/O	RF	VR-5	
											CV/PO	CS		
V-2191	E-3	2	C	3.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-5	
											CV/PO	CS		
V-2443	C-4	2	C	3.000	CHECK	A	S/A	C	NO		CV/C	QR		
											CV/O	RF	VR-6	
											CV/PO	QR	VR-6	
V-2444	B-4	2	C	3.000	CHECK	A	S/A	C	NO		CV/C	QR		
											CV/O	RF	VR-6	
											CV/PO	QR	VR-6	
V-2501	F-4	2	B	4.000	GATE	A	MO	O	YES	FAI	EC	CS		
											PI	2Y		
V-2504	F-3	2	B	3.000	GATE	A	MO	C	YES	FAI	EC	CS		
											EO	CS		
											PI	2Y		
V-2505	G-7	2	A	1.000	GLOBE	A	DO	C	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
											SLT-1	2Y		
V-2508	C-6	2	B	3.000	GATE	A	MO	C	YES	FAI	EO	QR		
											PI	2Y		
V-2509	C-7	2	B	3.000	GATE	A	MO	C	YES	FAI	EO	QR		
											PI	2Y		
V-2512	F-5	2	B	3.000	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		

P & ID: 2998-G-078 SH 121 (cont) SYSTEM: CHEMICAL AND VOLUME CONTROL

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-2514	C-3	2	B	3.000	GATE	A	MO	C	YES	FAI	EO	QR		
											PI	2Y		
V-2524	F-7	2	A	1.000	GLOBE	A	DO	C	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
											SLT-1	2Y		
V-2525	E-4	2	B	4.000	GLOBE	A	MO	C	YES	FAI	EC	QR		
											PI	2Y		
V-2526	E-3	2	C	4.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-5	
											CV/PO	CS		
V-2650	B-4	2	B	1.000	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
V-2651	D-4	2	B	1.000	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		

P & ID: 2998-G-078 SH 122 SYSTEM: CHEMICAL AND VOLUME CONTROL

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
SE-02-01	B-6	1	B	2.000	GLOBE	A	SO	O	YES	FO	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
SE-02-02	B-7	1	B	2.000	GLOBE	A	SO	O	YES	FO	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
SE-02-03	D-7	1	B	2.000	GLOBE	A	SO	LC	YES	FC	EC	CS		
											EO	CS		
											FS	CS		
											PI	2Y		
SE-02-04	D-7	1	B	2.000	GLOBE	A	SO	LC	YES	FC	EC	CS		
											EO	CS		
											FS	CS		
											PI	2Y		
V-2167	G-2	2	C	2.000	CHECK	A	S/A	C	NO		CV/C	QR		
											CV/O	QR		
V-2168	E-2	2	C	2.000	CHECK	A	S/A	C	NO		CV/C	QR		
											CV/O	QR		
V-2169	C-2	2	C	2.000	CHECK	A	S/A	C	NO		CV/C	QR		
											CV/O	QR		
V-2324	C-2	2	C	1.500	RELIEF	A	S/A	C	NO		SRV	RF		
V-2325	E-2	2	C	1.500	RELIEF	A	S/A	C	NO		SRV	RF		
V-2326	G-2	2	C	1.500	RELIEF	A	S/A	C	NO		SRV	RF		
V-2431	D-8	1	C	2.000	CHECK	A	S/A	C	NO		CV/O	CS		
V-2432	C-8	1	C	2.000	CHECK	A	S/A	C	NO		CV/O	QR		
V-2433	B-8	1	C	2.000	CHECK	A	S/A	C	NO		CV/O	QR		
V-2440	G-2	2	C	2.000	CHECK	A	S/A	O	NO		CV/O	CS		
V-2462	B-6	2	C	2.000	CHECK	A	S/A	C	NO		CV/O	QR		

P & ID: 2998-G-078 SH 122 (cont) SYSTEM: CHEMICAL AND VOLUME CONTROL

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-2515	F-8	1	B	2.000	GLOBE	A	DO	O	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
V-2516	F-7	1	A	2.000	GLOBE	A	DO	O	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
											SLT-1	2Y		
V-2523	B-6	2	B	2.000	GLOBE	P	DO	LO	YES	FO	PI	2Y		
V-2553	F-2	2	B	2.000	GLOBE	A	MO	O	YES	FAI	EC	QR		
											PI	2Y		
V-2554	D-2	2	B	2.000	GLOBE	A	MO	O	YES	FAI	EC	QR		
											PI	2Y		
V-2555	C-2	2	B	2.000	GLOBE	A	MO	O	YES	FAI	EC	QR		
											PI	2Y		
V-2598	C-6	2	B	3.000	GATE	A	MO	O	YES	FAI	EO	CS		
											PI	2Y		

P & ID: 2998-G-078 SH 130 SYSTEM: SAFETY INJECTION SYSTEM

VALVE-NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
FCV-3301	E-2	2	B	10.000	BUTFLY	A	MO	LO	YES	FAI	EC	QR		
											PI	2Y		
FCV-3306	F-4	2	B	10.000	BUTFLY	A	MO	LO	YES	FAI	EC	QR		
											PI	2Y		
HCV-3512	E-2	2	B	10.000	BUTFLY	A	MO	LC	YES	FAI	EO	QR		
											PI	2Y		
HCV-3657	F-4	2	B	10.000	BUTFLY	A	MO	LC	YES	FAI	EO	QR		
											PI	2Y		
SE-03-2A	G-2	2	A	2.000	GLOBE	A	SO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y	VR-4	
SE-03-2B	G-2	2	A	2.000	GLOBE	A	SO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y	VR-4	
SR-07-1A	E-7	2	C	0.750	RELIEF	A	S/A	C	NO		SRV	RF		
SR-07-1B	D-8	2	C	0.750	RELIEF	A	S/A	C	NO		SRV	RF		
V-07000	F-7	2	C	14.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-7	
											CV/PO	QR	VR-7	
V-07001	E-7	2	C	14.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-7	
											CV/PO	QR	VR-7	
V-3101	H-3	2	C	2.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-32	
											CV/PO	CS	VR-32	
V-3102	D-6	2	C	2.000	CHECK	A	S/A	C	NO		CV/C	CS	VR-30	
											CV/PO	QR	VR-30	
											INSP	RF	VR-30	
V-3103	D-5	2	C	2.000	CHECK	A	S/A	C	NO		CV/C	CS	VR-30	
											CV/PO	QR	VR-30	
											INSP	RF	VR-30	

P & ID: 2998-G-078 SH 130 (cont) SYSTEM: SAFETY INJECTION SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	* EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-3104	E-6	2	C	2.000	CHECK	A	S/A	C	NO		CV/C	CS	VR-28	
											CV/O	RF	VR-28	
											CV/PO	QR	VR-28	
V-3105	D-6	2	C	2.000	CHECK	A	S/A	C	NO		CV/C	CS	VR-28	
											CV/O	RF	VR-28	
											CV/PO	QR	VR-28	
V-3106	F-5	2	C	10.000	CHECK	A	S/A	C	NO		CV/O	CS		
V-3107	E-5	2	C	10.000	CHECK	A	S/A	C	NO		CV/O	CS		
V-3401	D-7	2	C	6.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-8	
											CV/PO	QR	VR-8	
V-3410	B-7	2	C	6.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-8	
											CV/PO	QR	VR-8	
V-3412	C-4	2	C	1.000	RELIEF	A	S/A	C	NO		SRV	RF		
V-3414	B-5	2	C	3.000	S/CHEK	A	S/A	C	NO		CV/C	QR		
											CV/O	RF	VR-9	
											CV/PO	QR	VR-9	
V-3417	D-4	2	C	1.000	RELIEF	A	S/A	C	NO		SRV	RF		
V-3427	D-5	2	C	3.000	S/CHEK	A	S/A	C	NO		CV/C	QR		
											CV/O	RF	VR-9	
											CV/PO	QR	VR-9	
V-3430	G-6	2	C	1.000	RELIEF	A	S/A	C	NO		SRV	RF		
V-3431	H-6	2	C	1.000	RELIEF	A	S/A	C	NO		SRV	RF		
V-3432	E-7	2	B	14.000	GATE	A	MO	LO	YES	FAI	EC	QR		
											PI	2Y		
V-3439	F-3	2	C	1.000	RELIEF	A	S/A	C	NO		SRV	RF		
V-3444	E-7	2	B	14.000	GATE	A	MO	LO	YES	FAI	EC	QR		
											PI	2Y		
V-3456	G-4	2	B	10.000	GATE	A	MO	LC	YES	FAI	EO	QR		
											PI	2Y		

P & ID: 2998-G-078 SH 130 (cont) SYSTEM: SAFETY INJECTION SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-3457	F-2	2	B	10.000	GATE	A	MO	LC	YES	FAI	EO	QR		
											PI	2Y		
V-3463	G-2	2	A	2.000	GATE	P	MAN	LC	NO		SLT-1	2Y		
V-3495	G-6	2	B	6.000	GLOBE	A	SO	LO	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
V-3496	G-5	2	B	6.000	GLOBE	A	SO	LO	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
V-3507	F-1	2	C	1.000	RELIEF	A	S/A	C	NO		SRV	RF		
V-3517	H-6	2	B	12.000	GATE	A	MO	LC	YES	FAI	EO	QR		
											PI	2Y		
V-3522	B-4	2	C	3.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-10	
V-3523	A-2	2	B	3.000	GLOBE	A	MO	LC	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
V-3540	C-2	2	B	3.000	GLOBE	A	MO	LC	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
V-3547	C-5	2	C	3.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-10	
V-3550	C-2	2	B	3.000	GLOBE	A	MO	LC	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
V-3551	A-2	2	B	3.000	GLOBE	A	MO	LC	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
V-3570	C-3	2	C	1.000	RELIEF	A	S/A	C	NO		SRV	RF		
V-3654	B-5	2	B	6.000	GATE	A	MO	LO	YES	FAI	EC	QR		
											PI	2Y		
V-3656	D-5	2	B	6.000	GATE	A	MO	LO	YES	FAI	EC	QR		
											PI	2Y		

P & ID: 2998-G-078 SH 130 (cont) SYSTEM: SAFETY INJECTION SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-3658	G-7	2	B	12.000	GATE	A	MO	LC	YES	FAI	EO PI	QR 2Y		
V-3659	G-6	2	B	3.000	GATE	A	MO	O	YES	FAI	EC PI	QR 2Y		
V-3660	G-5	2	B	3.000	GATE	A	MO	O	YES	FAI	EC PI	QR 2Y		

P & ID: 2998-G-078 SH 131 SYSTEM: SAFETY INJECTION SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
HCV-3615	H-7	2	B	6.000	GLOBE	A	MO	C	YES	FAI	EO PI	QR 2Y		
HCV-3616	G-7	2	B	2.000	GLOBE	A	MO	C	YES	FAI	EO PI	QR 2Y		
HCV-3617	G-7	2	B	2.000	GLOBE	A	MO	C	YES	FAI	EO PI	QR 2Y		
HCV-3625	F-7	2	B	6.000	GLOBE	A	MO	C	YES	FAI	EO PI	QR 2Y		
HCV-3626	E-7	2	B	2.000	GLOBE	A	MO	C	YES	FAI	EO PI	QR 2Y		
HCV-3627	E-7	2	B	2.000	GLOBE	A	MO	C	YES	FAI	EO PI	QR 2Y		
HCV-3635	D-7	2	B	6.000	GLOBE	A	MO	C	YES	FAI	EO PI	QR 2Y		
HCV-3636	C-7	2	B	2.000	GLOBE	A	MO	C	YES	FAI	EO PI	QR 2Y		
HCV-3637	C-7	2	B	2.000	GLOBE	A	MO	C	YES	FAI	EO PI	QR 2Y		
HCV-3645	B-7	2	B	6.000	GLOBE	A	MO	C	YES	FAI	EO PI	QR 2Y		
HCV-3646	A-7	2	B	2.000	GLOBE	A	MO	C	YES	FAI	EO PI	QR 2Y		
HCV-3647	A-7	2	B	2.000	GLOBE	A	MO	C	YES	FAI	EO PI	QR 2Y		
V-3113	G-7	2	C	2.000	CHECK	A	S/A	C	NO		CV/O CV/PO	RF SP	VR-11	
V-3114	H-7	2	C	6.000	CHECK	A	S/A	C	NO		CV/C CV/O	CS CS		
V-3124	F-7	2	C	6.000	CHECK	A	S/A	C	NO		CV/C CV/O	CS CS		

P & ID: 2998-G-078 SH 131 (cont) SYSTEM: SAFETY INJECTION SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-3133	C-7	2	C	2.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-11	
											CV/PO	SP		
V-3134	D-7	2	C	6.000	CHECK	A	S/A	C	NO		CV/C	CS		
											CV/O	CS		
V-3143	A-7	2	C	2.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-11	
											CV/PO	SP		
V-3144	B-7	2	C	6.000	CHECK	A	S/A	C	NO		CV/C	CS		
											CV/O	CS		
V-3469	D-5	2	C	0.750	RELIEF	A	S/A	C	NO		SRV	RF		
V-3480	E-3	1	A	10.000	GATE	A	MO	C	YES	FAI	EO	CS		
											PI	2Y		
											SLT-2	SP	VR-29	
V-3481	E-4	1	A	10.000	GATE	A	MO	C	YES	FAI	EO	CS		
											PI	2Y		
											SLT-2	SP	VR-29	
V-3482	E-4	2	C	0.750	RELIEF	A	S/A	C	NO		SRV	RF		
V-3524	F-5	1	AC	3.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-12	
											CV/O	RF	VR-12	
											SLT-2	SP	VR-2	
V-3525	F-4	1	AC	3.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-12	
											CV/O	RF	VR-12	
											SLT-2	SP	VR-2	& VR-12
V-3526	C-5	1	AC	3.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-12	
											CV/O	RF	VR-12	
											SLT-2	SP	VR-2	
V-3527	C-4	1	AC	3.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-12	
											CV/O	RF	VR-12	
											SLT-2	SP	VR-2	& VR-12
V-3536	E-8	2	B	4.000	GLOBE	A	MO	LC	YES	FAI	EC	QR		
											PI	2Y		
V-3539	C-8	2	B	4.000	GLOBE	A	MO	LC	YES	FAI	EC	QR		
											PI	2Y		

[illegible]

P & ID: 2998-G-078 SH 131 (cont) SYSTEM: SAFETY INJECTION SYSTEM

VALVE-NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-3545	E-4	1	B	10.000	GATE	A	MO	LC	YES	FAI	EO	CS		
											PI	2Y		
V-3571	B-4	1	B	1.000	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
V-3572	F-4	1	B	1.000	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
V-3651	D-3	1	A	10.000	GATE	A	MO	C	YES	FAI	EO	CS		
											PI	2Y		
											SLT-2	SP	VR-29	
V-3652	D-5	1	A	10.000	GATE	A	MO	C	YES	FAI	EO	CS		
											PI	2Y		
											SLT-2	SP	VR-29	
V-3664	E-6	2	B	10.000	GATE	A	MO	LC	YES	FAI	EO	CS		
											PI	2Y		
V-3665	C-6	2	B	10.000	GATE	A	MO	LC	YES	FAI	EO	CS		
											PI	2Y		
V-3666	D-6	2	C	6.000	RELIEF	A	S/A	C	NO		SRV	RF		
V-3667	E-6	2	C	6.000	RELIEF	A	S/A	C	NO		SRV	RF		
V-3766	E-7	2	C	2.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-11	
											CV/PO	SP		

P.& ID: 2998-G-078 SH 132 SYSTEM: SAFETY INJECTION SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
HCV-3618	E-7	1	B	1.000	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
HCV-3628	E-4	1	B	1.000	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
HCV-3638	B-7	1	B	1.000	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
HCV-3648	B-4	1	B	1.000	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
SE-03-1A	F-3	2	B	1.000	GLOBE	A	SO	NC	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
SE-03-1B	F-7	2	B	1.000	GLOBE	A	SO	NC	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
SE-03-1C	C-7	2	B	1.000	GLOBE	A	SO	NC	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
SE-03-1D	C-3	2	B	1.000	GLOBE	A	SO	NC	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
V-3215	F-5	2	AC	12.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-13	
											INSP	SP	VR-13	
											SLT-2	SP	VR-2	
V-3217	E-6	1	AC	12.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-14	
											CV/PO	CS	VR-14	
											INSP	SP	VR-14	
											SLT-2	SP	VR-2	
V-3225	F-2	2	AC	12.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-13	
											INSP	SP	VR-13	
											SLT-2	SP	VR-2	

P & ID: 2998-G-078 SH 132 (cont) SYSTEM: SAFETY INJECTION SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-3227	E-6	1	AC	12.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-14	
											CV/PO	CS	VR-14	
											INSP	SP	VR-14	
											SLT-2	SP	VR-2	
V-3235	F-2	2	AC	12.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-13	
											INSP	SP	VR-13	
											SLT-2	SP	VR-2	
V-3237	E-6	1	AC	12.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-14	
											CV/PO	CS	VR-14	
											INSP	SP	VR-14	
											SLT-2	SP	VR-2	
V-3245	F-2	2	AC	12.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-13	
											INSP	SP	VR-13	
											SLT-2	SP	VR-2	
V-3247	E-6	1	AC	12.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-14	
											CV/PO	CS	VR-14	
											INSP	SP	VR-14	
											SLT-2	SP	VR-2	
V-3258	F-2	1	AC	6.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-15	
											CV/O	CS	VR-15	
											CV/PO	SP		
											SLT-2	SP	VR-2	
V-3259	F-5	1	AC	6.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-15	
											CV/O	CS	VR-15	
											CV/PO	SP		
											SLT-2	SP	VR-2	
V-3260	B-5	1	AC	6.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-15	
											CV/O	CS	VR-15	
											CV/PO	SP		
											SLT-2	SP	VR-2	
V-3261	B-2	1	AC	6.000	CHECK	A	S/A	C	NO		CV/C	SP	VR-15	
											CV/O	CS	VR-15	
											CV/PO	SP		
											SLT-2	SP	VR-2	

P & ID: 2998-G-078 SH 132 (cont) SYSTEM: SAFETY INJECTION SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-3611	F-6	2	B	1.000	GLOBE	A	AO	C	YES	FC	EC FS PI	CS CS 2Y		
V-3614	F-6	1	B	12.000	GATE	A	MO	LO	YES	FAI	EC PI	CS 2Y		
V-3621	F-3	2	B	1.000	GLOBE	A	AO	C	YES	FC	EC FS PI	CS CS 2Y		
V-3624	F-3	1	B	12.000	GATE	A	MO	LO	YES	FAI	EC PI	CS 2Y		
V-3631	B-6	2	B	1.000	GLOBE	A	AO	C	YES	FC	EC FS PI	CS CS 2Y		
V-3634	B-6	1	B	12.000	GATE	A	MO	LO	YES	FAI	EC PI	CS 2Y		
V-3641	B-3	2	B	1.000	GLOBE	A	AO	C	YES	FC	EC FS PI	CS CS 2Y		
V-3644	B-3	1	B	12.000	GATE	A	MO	LO	YES	FAI	EC PI	CS 2Y		
V-3733	G-7	2	B	1.000	GATE	A	SO	C	YES	FC	EO PI	CS 2Y		
V-3734	G-7	2	B	1.000	GATE	A	SO	C	YES	FC	EO PI	CS 2Y		
V-3735	G-4	2	B	1.000	GATE	A	SO	C	YES	FC	EO PI	CS 2Y		
V-3736	G-4	2	B	1.000	GATE	A	SO	C	YES	FC	EO PI	CS 2Y		
V-3737	D-7	2	B	1.000	GATE	A	SO	C	YES	FC	EO PI	CS 2Y		
V-3738	D-7	2	B	1.000	GATE	A	SO	C	YES	FC	EO PI	CS 2Y		

P & ID: 2998-G-078 SH 132 (cont) SYSTEM: SAFETY INJECTION SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-3739	D-4	2	B	1.000	GATE	A	SO	C	YES	FC	EO	CS		
											PI	2Y		
V-3740	D-4	2	B	1.000	GATE	A	SO	C	YES	FC	EO	CS		
											PI	2Y		

P & ID: 2998-G-078 SH 153 SYSTEM: SAMPLING SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
SE-05-1A	G-7	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
SE-05-1B	F-7	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
SE-05-1C	E-7	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
SE-05-1D	C-7	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
SE-05-1E	G-5	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
V-5200	F-6	2	A	0.375	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
V-5201	E-6	2	A	0.375	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
V-5202	D-6	2	A	0.375	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
V-5203	F-5	2	A	0.375	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		

P & ID: 2998-G-078 SH 153 (cont) SYSTEM: SAMPLING SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-5204	E-5	2	A	0.375	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
V-5205	D-5	2	A	0.375	GLOBE	A	DO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		

P & ID: 2998-G-078 SH 160 SYSTEM: WASTE MANAGEMENT SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-6341	E-7	2	A	3.000	DIAPH	A	AO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
V-6342	E-6	2	A	3.000	DIAPH	A	AO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		

P & ID: 2998-G-078 SH 163 SYSTEM: WASTE MANAGEMENT SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-6718	E-7	2	A	1.000	DIAPH	A	AO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
V-6741	B-2	2	A	1.000	GLOBE	A	AO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
V-6750	E-7	2	A	1.000	DIAPH	A	AO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
V-6792	C-7	2	AC	1.000	CHECK	A	S/A	C	NO		CV/C	CS	VR-17	
											SLT-1	2Y		

P & ID: 2998-G-079 SH 1 SYSTEM: MAIN STEAM SYSTEM

VALVE NUMBER	COORD.	CL.	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
HCV-08-1A	K-13	2	B	34.000	GLOBE	A	PO	O	YES		EC	CS		
											PEC	QR		
											PI	2Y		
HCV-08-1B	K-13	2	B	34.000	GLOBE	A	PO	O	YES		EC	CS		
											PEC	QR		
											PI	2Y		
MV-08-12	N-8	2	B	4.000	GATE	A	MO	C	YES	FAI	EO	QR		
											PI	2Y		
MV-08-13	N-10	2	B	4.000	GATE	A	MO	C	YES	FAI	EO	QR		
											PI	2Y		
MV-08-14	K-8	2	B	10.000	GATE	P	MO	O	YES	FAI	PI	2Y		
MV-08-15	K-10	2	B	10.000	GATE	P	MO	O	YES	FAI	PI	2Y		
MV-08-16	D-10	2	B	10.000	GATE	P	MO	O	YES	FAI	PI	2Y		
MV-08-17	D-8	2	B	10.000	GATE	P	MO	O	YES	FAI	PI	2Y		
MV-08-18A	J-8	2	B	10.000	ANGLE	A	MO	C	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
MV-08-18B	D-10	2	B	10.000	ANGLE	A	MO	C	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
MV-08-19A	J-10	2	B	10.000	ANGLE	A	MO	C	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
MV-08-19B	D-8	2	B	10.000	ANGLE	A	MO	C	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
MV-08-1A	K-13	2	B	3.000	GLOBE	A	MO	C	YES	FAI	EC	QR		
											PI	2Y		
MV-08-1B	C-13	2	B	3.000	GLOBE	A	MO	C	YES	FAI	EC	QR		
											PI	2Y		

P & ID: 2998-G-079 SH 1 (cont) SYSTEM: MAIN STEAM SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
MV-08-3	N-14	3	B	4.000	GLOBE	A	MO	C	YES	FAI	EO PI	QR 2Y		
SR-8201	J-12	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8202	J-12	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8203	J-12	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8204	J-12	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8205	C-11	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8206	C-11	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8207	C-11	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8208	C-11	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8209	J-12	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8210	J-12	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8211	J-12	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8212	J-12	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8213	C-11	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8214	C-11	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8215	C-11	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
SR-8216	C-11	2	C	6.000	SAFETY	A	S/A	C	NO		SRV	RF		
V-8130	L-10	3	C	4.000	CHECK	A	S/A	C	NO		CV/O CV/PO INSP	CS QR RF	 VR-31	
V-8163	L-10	3	C	4.000	CHECK	A	S/A	C	NO		CV/O CV/PO INSP	CS QR RF	 VR-31	

P & ID: 2998-G-080 SH 2 SYSTEM: FEEDWATER SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
HCV-09-1A	B-14	2	B	20.000	GATE	A	PO	O	YES	FO	EC	CS		
											FS	CS		
											PEC	QR		
											PI	2Y		
HCV-09-1B	B-13	2	B	20.000	GATE	A	PO	O	YES	FO	EC	CS		
											FS	CS		
											PEC	QR		
											PI	2Y		
HCV-09-2A	E-13	2	B	20.000	GATE	A	PO	O	YES	FO	EC	CS		
											FS	CS		
											PEC	QR		
											PI	2Y		
HCV-09-2B	E-13	2	B	20.000	GATE	A	PO	O	YES	FO	EC	CS		
											FS	CS		
											PEC	QR		
											PI	2Y		
MV-09-09	G-16	2	B	4.000	GLOBE	A	MO	C	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
MV-09-10	I-15	2	B	4.000	GLOBE	A	MO	C	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
MV-09-11	G-12	2	B	4.000	GLOBE	A	MO	C	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
MV-09-12	I-12	2	B	4.000	GLOBE	A	MO	C	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
MV-09-13	H-17	3	B	2.500	GATE	A	MO	C	YES	FAI	EO	QR		
											PI	2Y		
MV-09-14	H-17	3	B	2.500	GATE	A	MO	C	YES	FAI	EO	QR		
											PI	2Y		

P & ID: 2998-G-080 SH 2 (cont) SYSTEM: FEEDWATER SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
SE-09-2	K-15	3	B	4.000	GATE	A	SO	C	YES	FC	EC	CS	VR-33	
											EE	QR	VR-33	
											EO	CS	VR-33	
											FS	QR		
											PI	2Y		
SE-09-3	J-15	3	B	4.000	GATE	A	SO	C	YES	FC	EC	CS	VR-33	
											EE	QR	VR-33	
											EO	CS	VR-33	
											FS	QR		
											PI	2Y		
SE-09-4	H-11	3	B	4.000	GATE	A	SO	C	YES	FC	EC	CS	VR-33	
											EE	QR	VR-33	
											EO	CS	VR-33	
											FS	QR		
											PI	2Y		
SE-09-5	I-11	3	B	4.000	GATE	A	SO	C	YES	FC	EC	CS	VR-33	
											EE	QR	VR-33	
											EO	CS	VR-33	
											FS	QR		
											PI	2Y		
V-09107	H-14	B	C	4.000	CHECK	A	S/A	C	NO		CV/C	CS		
											CV/O	CS		
V-09119	G-15	2	C	4.000	CHECK	A	S/A	C	NO		CV/O	CS		
V-09123	L-14	B	C	4.000	CHECK	A	S/A	C	NO		CV/C	CS		
											CV/O	CS		
V-09135	I-15	2	C	4.000	CHECK	A	S/A	C	NO		CV/O	CS		
V-09139	J-14	B	C	6.000	CHECK	A	S/A	C	NO		CV/O	CS		
V-09151	G-12	2	C	4.000	CHECK	A	S/A	C	NO		CV/O	CS		
V-09157	I-12	2	C	4.000	CHECK	A	S/A	C	NO		CV/O	CS		
V-09252	B-16	2	C	18.000	CHECK	A	S/A	O	NO		CV/O	QR		
V-09294	E-16	2	C	18.000	CHECK	A	S/A	O	NO		CV/O	QR		

P & ID: 2998-G-080 SH 2 (cont) SYSTEM: FEEDWATER SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-09303	L-13	3	C	2.000	CHECK	A	S/A	C	NO		CV/PO	QR	VR-27	
											INSP	RF	VR-27	
V-09304	M-12	3	C	1.500	CHECK	A	S/A	C	NO		CV/PO	QR	VR-27	
											INSP	RF	VR-27	
V-09305	N-13	3	C	1.500	CHECK	A	S/A	C	NO		CV/PO	QR	VR-27	
											INSP	RF	VR-27	

P & ID: 2998-G-082 SYSTEM: INTAKE COOLING WATER SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
MV-21-2	E-5	3	B	24.000	BUTFLY	A	MO	O	YES	FAI	EC PI	QR 2Y		
MV-21-3	E-4	3	B	24.000	BUTFLY	A	MO	O	YES	FAI	EC PI	QR 2Y		
MV-21-4A	I-3	3	B	3.000	BUTFLY	A	MO	O	YES	FAI	EC PI	QR 2Y		
MV-21-4B	I-3	3	B	3.000	BUTFLY	A	MO	O	YES	FAI	EC PI	QR 2Y		
TCV-14-4A	B-3	3	B	30.000	BUTFLY	A	AO	O	NO	FO	EC FS	QR QR	VR-34	
TCV-14-4B	B-4	3	B	30.000	BUTFLY	A	AO	O	NO	FO	EC FS	QR QR	VR-34	
V-21162	H-4	3	C	30.000	CHECK	A	S/A	C	NO		CV/C CV/O	QR QR		
V-21205	H-6	3	C	30.000	CHECK	A	S/A	C	NO		CV/C CV/O	QR QR		
V-21208	H-7	3	C	30.000	CHECK	A	S/A	C	NO		CV/C CV/O	QR QR		
V-21431	H-5	3	C	1.000	CHECK	A	S/A	C	NO		CV/C CV/O	QR QR		
V-21434	H-5	3	C	1.000	CHECK	A	S/A	C	NO		CV/C CV/O	QR QR		
V-21523	I-7	3	C	2.000	CHECK	A	S/A	C	NO		CV/O	QR		
V-21524	I-7	3	C	2.000	CHECK	A	S/A	C	NO		CV/O	QR		

P & ID: 2998-G-083 SYSTEM: COMPONENT COOLING SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
HCV-14-1	C-6	2	A	8.000	BUTFLY	A	AO	O	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
											SLT-1	2Y	VR-4	& VR-16
HCV-14-10	H-15	3	B	16.000	BUTFLY	A	AO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
HCV-14-2	C-1	2	A	8.000	BUTFLY	A	AO	O	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
											SLT-1	2Y	VR-4	& VR-16
HCV-14-3A	L-3	3	B	14.000	BUTFLY	A	DO	O	YES	FO	EO	CS		
											FS	CS		
											PI	2Y		
HCV-14-3B	M-3	3	B	14.000	BUTFLY	A	DO	O	YES	FO	EO	CS		
											FS	CS		
											PI	2Y		
HCV-14-6	D-2	2	A	8.000	BUTFLY	A	AO	O	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
											SLT-1	2Y	VR-4	& VR-16
HCV-14-7	D-6	2	A	8.000	BUTFLY	A	AO	O	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
											SLT-1	2Y	VR-4	& VR-16
HCV-14-8A	G-14	3	B	16.000	BUTFLY	A	AO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
HCV-14-8B	G-15	3	B	16.000	BUTFLY	A	AO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
HCV-14-9	G-15	3	B	16.000	BUTFLY	A	AO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		

P & ID: 2998-G-083 (cont) SYSTEM: COMPONENT COOLING SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
MV-14-1	D-16	3	B	24.000	BUTFLY	A	MO	O	YES	FAI	EC EO PI	QR QR 2Y		
MV-14-10	C-9	2	B	8.000	BUTFLY	A	MO	O	YES	FAI	EC PI	QR 2Y		
MV-14-11	C-10	2	B	8.000	BUTFLY	A	MO	O	YES	FAI	EC PI	QR 2Y		
MV-14-12	C-10	2	B	8.000	BUTFLY	A	MO	O	YES	FAI	EC PI	QR 2Y		
MV-14-13	C-8	2	B	8.000	BUTFLY	A	MO	O	YES	FAI	EC PI	QR 2Y		
MV-14-14	C-8	2	B	8.000	BUTFLY	A	MO	O	YES	FAI	EC PI	QR 2Y		
MV-14-15	C-9	2	B	8.000	BUTFLY	A	MO	O	YES	FAI	EC PI	QR 2Y		
MV-14-16	C-8	2	B	8.000	BUTFLY	A	MO	O	YES	FAI	EC PI	QR 2Y		
MV-14-17	G-13	3	B	12.000	BUTFLY	A	MO	O	YES	FAI	EC PI	QR 2Y		
MV-14-18	G-13	3	B	12.000	BUTFLY	A	MO	LC	YES	FAI	EC PI	QR 2Y		
MV-14-19	G-12	3	B	12.000	BUTFLY	A	MO	O	YES	FAI	EC PI	QR 2Y		
MV-14-2	D-17	3	B	24.000	BUTFLY	A	MO	C	YES	FAI	EC EO PI	QR QR 2Y		
MV-14-20	G-12	3	B	12.000	BUTFLY	A	MO	LC	YES	FAI	EC PI	QR 2Y		
MV-14-3	G-16	3	B	24.000	BUTFLY	A	MO	O	YES	FAI	EC EO PI	QR QR 2Y		

P & ID: 2998-G-083 (cont) SYSTEM: COMPONENT COOLING SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
MV-14-4	G-17	3	B	24.000	BUTFLY	A	MO	C	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
MV-14-9	C-10	2	B	8.000	BUTFLY	A	MO	O	YES	FAI	EC	QR		
											PI	2Y		
V-14143	E-16	3	C	20.000	CHECK	A	S/A	C	NO		CV/C	QR		
											CV/O	QR		
V-14147	E-17	3	C	20.000	CHECK	A	S/A	C	NO		CV/C	QR		
											CV/O	QR		
V-14151	E-16	3	C	20.000	CHECK	A	S/A	C	NO		CV/C	QR		
											CV/O	QR		

P & ID: 2998-G-084   SYSTEM: MAKEUP WATER SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
HCV-15-1	H-17	2	A	2.000	GLOBE	A	DO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
V-15328	I-17	2	AC	2.000	CHECK	A	S/A	C	NO		CV/C	CS	VR-18	
											SLT-1	2Y		

P & ID: 2998-G-085 SH 1   SYSTEM: SERVICE AIR

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
HCV-18-2	H-6	2	A	2.000	GLOBE	A	AO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
V-181270	H-5	2	AC	2.000	CHECK	A	S/A	O/C	NO		CV/C	CS		
											SLT-1	2Y		
V-18797	G-6	2	A	1.000	BALL	P	MAN	LC	NO		SLT-1	2Y		

P & ID: 2998-G-085 SH 2 SYSTEM: INSTRUMENT AIR

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
HCV-18-1	G-7	2	A	2.000	GLOBE	A	DO	O	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
											SLT-1	2Y		
V-18195	G-6	2	AC	2.000	CHECK	A	S/A	C	NO		CV/C	2Y	VR-19	
											SLT-1	2Y		
V-18279	J-2	2	AC	0.500	CHECK	A	S/A	C	NO		CV/C	CS		
											SLT-3	CS		
V-18283	J-1	2	AC	0.500	CHECK	A	S/A	C	NO		CV/C	CS		
											SLT-3	CS		
V-18290	L-1	NC	AC	0.750	CHECK	A	S/A	C	NO		CV/C	CS		
											SLT-3	CS		
V-18291	L-1	2	AC	0.750	CHECK	A	S/A	C	NO		CV/C	CS		
											SLT-3	CS		
V-18294	M-1	2	AC	0.750	CHECK	A	S/A	C	NO		CV/C	CS		
											SLT-3	CS		
V-18295	M-1	2	AC	0.750	CHECK	A	S/A	C	NO		CV/C	CS		
											SLT-3	CS		

P & ID: 2998-G-086 SH 1 SYSTEM: MISCELLANEOUS SYSTEMS

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
FCV-23-3	D-14	2	B	2.000	GATE	A	DO	O	YES	FC	EC FS PI	QR QR 2Y		
FCV-23-5	D-15	2	B	2.000	GATE	A	DO	O	YES	FC	EC FS PI	QR QR 2Y		
FCV-23-7	D-17	2	B	0.500	GLOBE	A	DO	O	YES	FC	EC FS PI	QR QR 2Y		
FCV-23-9	D-18	2	B	0.500	GLOBE	A	DO	O	YES	FC	EC FS PI	QR QR 2Y		
SR-17221	J-13	3	C	0.750	RELIEF	A	S/A	C	NO		SRV	RF		
SR-17222	L-13	3	C	0.750	RELIEF	A	S/A	C	NO		SRV	RF		
V-17204	J-13	3	C	2.000	CHECK	A	S/A	C	NO		CV/O	QR		
V-17214	L-13	3	C	2.000	CHECK	A	S/A	C	NO		CV/O	QR		

P & ID: 2998-G-088 SYSTEM: CONTAINMENT SPRAY SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
FCV-07-1A	F-12	2	B	12.000	GATE	A	DO	C	YES	FO	EO	QR		
											FS	QR		
											PI	2Y		
FCV-07-1B	F-12	2	B	12.000	GATE	A	DO	C	YES	FO	EO	QR		
											FS	QR		
											PI	2Y		
LCV-07-11A	I-14	2	A	2.000	GLOBE	A	DO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
LCV-07-11B	I-13	2	A	2.000	GLOBE	A	DO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
MV-07-1A	E-3	2	B	24.000	BUTFLY	A	MO	LO	YES	FAI	EC	QR		
											PI	2Y		
MV-07-1B	E-2	2	B	24.000	BUTFLY	A	MO	LO	YES	FAI	EC	QR		
											PI	2Y		
MV-07-2A	I-12	2	B	24.000	BUTFLY	A	MO	C	YES	FAI	EO	QR		
											PI	2Y		
MV-07-2B	J-12	2	B	24.000	BUTFLY	A	MO	C	YES	FAI	EO	QR		
											PI	2Y		
MV-07-3	F-11	2	B	12.000	GATE	A	MO	O	YES	FAI	EC	QR		
											PI	2Y		
MV-07-4	F-11	2	B	12.000	GATE	A	MO	O	YES	FAI	EC	QR		
											PI	2Y		
SE-07-3A	C-9	2	B	2.000	GLOBE	A	SO	C	YES	FO	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
SE-07-3B	E-9	2	B	2.000	GLOBE	A	SO	C	YES	FO	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		

P & ID: 2998-G-088 (cont) SYSTEM: CONTAINMENT SPRAY SYSTEM

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
SR-07-2A	B-10	2	C	1.500	RELIEF	A	S/A	C	NO		SRV	RF		
SR-07-2B	C-10	2	C	1.500	RELIEF	A	S/A	C	NO		SRV	RF		
V-7119	J-7	2	C	24.000	CHECK	A	S/A	C	NO		CV/PO	QR	VR-20	
											CV/PO	RF	VR-20	
											INSP	RF	VR-20	
V-7120	I-7	2	C	24.000	CHECK	A	S/A	C	NO		CV/PO	QR	VR-20	
											CV/PO	RF	VR-20	
											INSP	RF	VR-20	
V-7129	H-5	2	C	12.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-21	
											CV/PO	QR	VR-21	
V-7130	H-6	2	B	12.000	GATE	A	MAN	O	NO		EE	QR		
V-7143	G-5	2	C	12.000	CHECK	A	S/A	C	NO		CV/O	RF	VR-21	
											CV/PO	QR	VR-21	
V-7145	G-6	2	B	12.000	GATE	A	MAN	O	NO		EE	QR		
V-7170	G-13	2	A	3.000	GATE	P	MAN	LC	NO		SLT-1	2Y		
V-7172	J-10	2	C	24.000	CHECK	A	S/A	C	NO		INSP	RF	VR-22	
V-7174	I-10	2	C	24.000	CHECK	A	S/A	C	NO		INSP	RF	VR-22	
V-7188	G-14	2	A	3.000	GATE	P	MAN	LC	NO		SLT-1	2Y		
V-7189	G-14	2	A	3.000	GATE	P	MAN	LC	NO		SLT-1	2Y		
V-7192	E-14	2	C	10.000	CHECK	A	S/A	C	NO		INSP	RF	VR-23	
V-7193	E-14	2	C	10.000	CHECK	A	S/A	C	NO		INSP	RF	VR-23	
V-7206	G-13	2	A	3.000	GATE	P	MAN	LC	NO		SLT-1	2Y		
V-7231	A-13	2	C	2.000	CHECK	A	S/A	C	NO		CV/O	QR		
V-7232	A-13	2	C	2.000	CHECK	A	S/A	C	NO		CV/O	QR		
V-7256	E-8	2	C	1.500	CHECK	A	S/A	C	NO		CV/O	RF	VR-24	
V-7258	F-8	2	C	1.500	CHECK	A	S/A	C	NO		CV/O	RF	VR-24	

P & ID: 2998-G-088 (cont) SYSTEM: CONTAINMENT SPRAY SYSTEM

VALVE NUMBER	COORD.	CL.	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-7412	B-10	2	C	1.500	CHECK	A	S/A	C	NO		CV/O	QR		

P & ID: 2998-G-091 SYSTEM: MISCELLANEOUS SYSTEMS

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-00-101	B-6	2	A	8.000	GATE	P	MAN	C	NO		SLT-1	2Y	VR-4	& VR-16
V-00-139	L-10	2	A	0.375	GLOBE	P	MAN	LC	NO		SLT-1	2Y		
V-00-140	M-10	2	A	1.000	GLOBE	P	MAN	LC	NO		SLT-1	2Y		
V-00-143	M-11	2	A	1.000	GLOBE	P	MAN	LC	NO		SLT-1	2Y		
V-00-144	L-11	2	A	0.375	GLOBE	P	MAN	LC	NO		SLT-1	2Y		

P & ID: 2998-G-092 SH 1 SYSTEM: MISC. SAMPLING SYSTEMS

VALVE NUMBER	COORD.	CL.	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
FCV-26-1	G-2	2	A	1.000	GLOBE	A	DO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
FCV-26-2	G-4	2	A	1.000	GLOBE	A	DO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
FCV-26-3	H-2	2	A	1.000	GLOBE	A	DO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
FCV-26-4	H-4	2	A	1.000	GLOBE	A	DO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
FCV-26-5	I-2	2	A	1.000	GLOBE	A	DO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
FCV-26-6	I-4	2	A	1.000	GLOBE	A	DO	O	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
FSE-27-10	B-13	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
FSE-27-11	C-13	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		

P & ID: 2998-G-092 SH 1 (cont) SYSTEM: MISC. SAMPLING SYSTEMS

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
FSE-27-12	B-15	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
FSE-27-13	B-15	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
FSE-27-14	B-15	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
FSE-27-15	D-13	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
FSE-27-16	D-13	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
FSE-27-17	D-14	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
FSE-27-18	D-14	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

P & ID: 2998-G-092 SH 1 (cont) SYSTEM: MISC. SAMPLING SYSTEMS

VALVE NUMBER	COORD.	CL.	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
FSE-27-8	A-13	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
FSE-27-9	B-13	2	A	0.375	GLOBE	A	SO	C	YES	FC	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		
V-27101	B-14	2	AC	0.375	CHECK	A	S/A	O/C	NO		CV/C	CS	VR-25	
											CV/O	QR		
											SLT-1	2Y		
V-27102	B-14	2	AC	0.375	CHECK	A	S/A	O/C	NO		CV/C	CS	VR-25	
											CV/O	QR		
											SLT-1	2Y		

P & ID: 2998-G-096 SH 1 SYSTEM: EMERGENCY DIESEL GENERATOR 2A

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
FCV-59-1A1	H-6	3	B	1.500	GATE	A	AO	C	NO	FC	EO	SP	VR-26	
FCV-59-2A1	J-10	3	B	1.500	GATE	A	AO	C	NO	FC	EO	SP	VR-26	
FCV-59-3A1	C-10	3	B	1.500	GATE	A	AO	C	NO	FC	EO	SP	VR-26	
FCV-59-4A1	H-2	3	B	1.500	GATE	A	AO	C	NO	FC	EO	SP	VR-26	
SE-59-1A1	B-16	3	B	1.500	GLOBE	A	SO	C	NO	FC	EC EO FS	QR QR QR		
SE-59-1A2	K-1	3	B	1.500	GLOBE	A	SO	C	NO	FC	EC EO FS	QR QR QR		
SE-59-3A	L-6	3	B	1.500	GATE	A	SO	C	NO	FC	EO	SP	VR-26	
SE-59-4A	L-3	3	B	1.500	GATE	A	SO	C	NO	FC	EO	SP	VR-26	
SE-59-5A	J-9	3	B	1.500	GATE	A	SO	C	NO	FC	EO	SP	VR-26	
SE-59-6A	C-10	3	B	1.500	GATE	A	SO	C	NO	FC	EO	SP	VR-26	
SR-59-3A	J-12	3	C	0.750	RELIEF	A	S/A	C	NO		SRV	RF		
SR-59-4A	J-11	3	C	0.750	RELIEF	A	S/A	C	NO		SRV	RF		
SR-59-5A.	J-9	3	C	0.750	RELIEF	A	S/A	C	NO		SRV	RF		
SR-59-6A	J-8	3	C	0.750	RELIEF	A	S/A	C	NO		SRV	RF		
V-59156	H-12	3	C	1.250	CHECK	A	S/A	C	NO		CV/C SLT-3	QR QR		
V-59158	H-10	3	C	1.250	CHECK	A	S/A	C	NO		CV/C SLT-3	QR QR		
V-59159	H-8	3	C	1.250	CHECK	A	S/A	C	NO		CV/C SLT-3	QR QR		
V-59236	H-11	3	C	1.250	CHECK	A	S/A	C	NO		CV/C SLT-3	QR QR		

P & ID: 2998-G-096 SH 2 SYSTEM: EMERGENCY DIESEL GENERATOR 2B

VALVE NUMBER	COORD	CL	CAT	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
FCV-59-1B1	C-10	3	B	1.500	GATE	A	AO	C	NO	FC	EO	SP	VR-26	
FCV-59-2B1	M-2	3	B	1.500	GATE	A	AO	C	NO	FC	EO	SP	VR-26	
FCV-59-3B1	J-10	3	B	1.500	GATE	A	AO	C	NO	FC	EO	SP	VR-26	
FCV-59-4B1	M-5	3	B	1.500	GATE	A	AO	C	NO	FC	EO	SP	VR-26	
SE-59-1B1	B-16	3	B	1.500	GLOBE	A	SO	C	NO	FC	EC EO FS	QR QR QR		
SE-59-1B2	K-1	3	B	1.500	GLOBE	A	SO	C	NO	FC	EC EO FS	QR QR QR		
SE-59-3B	L-6	3	B	1.500	GATE	A	SO	C	NO	FC	EO	SP	VR-26	
SE-59-4B	L-3	3	B	1.500	GATE	A	SO	C	NO	FC	EO	SP	VR-26	
SE-59-5B	K-9	3	B	1.500	GATE	A	SO	C	NO	FC	EO	SP	VR-26	
SE-59-6B	D-10	3	B	1.500	GATE	A	SO	C	NO	FC	EO	SP	VR-26	
SR-59-3B	J-12	3	C	0.750	RELIEF	A	S/A	C	NO		SRV	RF		
SR-59-4B	J-11	3	C	0.750	RELIEF	A	S/A	C	NO		SRV	RF		
SR-59-5B	J-9	3	C	0.750	RELIEF	A	S/A	C	NO		SRV	RF		
SR-59-6B	J-8	3	C	0.750	RELIEF	A	S/A	C	NO		SRV	RF		
V-59203	M-12	3	C	1.250	CHECK	A	S/A	C	NO		CV/C SLT-3	QR QR		
V-59204	M-11	3	C	1.250	CHECK	A	S/A	C	NO		CV/C SLT-3	QR QR		
V-59205	M-10	3	C	1.250	CHECK	A	S/A	C	NO		CV/C SLT-3	QR QR		
V-59206	M-9	3	C	1.250	CHECK	A	S/A	C	NO		CV/C SLT-3	QR QR		

P & ID: 2998-G-878 SYSTEM: HVAC

VALVE NUMBER	COORD	CL	CAT	SIZE	TYPE	A/P	ACT. TYPE	NORM POS	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
FCV-25-1	C-2	NC	B	48.000	BUTFLY	A	PO	C	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
FCV-25-2	J-15	2	A	48.000	BUTFLY	A	PO	C	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
											SLT-1	2Y	VR-4	& VR-16
FCV-25-3	J-15	2	A	48.000	BUTFLY	A	PO	C	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
											SLT-1	2Y	VR-4	& VR-16
FCV-25-4	K-12	2	A	48.000	BUTFLY	A	PO	C	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
											SLT-1	2Y	VR-4	& VR-16
FCV-25-5	K-12	2	A	48.000	BUTFLY	A	PO	C	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
											SLT-1	2Y		VR-16
FCV-25-6	C-8	NC	B	48.000	BUTFLY	A	PO	C	YES	FC	EC	CS		
											FS	CS		
											PI	2Y		
FCV-25-7	L-12	2	A	24.000	BUTFLY	A	PO	C	YES	FC	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		VR-16
FCV-25-8	L-12	2	A	24.000	BUTFLY	A	PO	C	YES	FC	EC	QR		
											EO	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y		VR-16
V-25-20	C-13	2	AC	24.000	CHECK	A	S/A	C	NO		CV/C	CS		
											CV/O	CS		
											SLT-1	2Y		VR-16

P & ID: 2998-G-878 (cont) SYSTEM: HVAC

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
V-25-21	C-13	2	AC	24.000	CHECK	A	S/A	C	NO		CV/C	CS		
											CV/O	CS		
											SLT-1	2Y		VR-16

P & ID: 2998-G-879 SH 2 SYSTEM: HVAC

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
FCV-25-14	E-6	3	B	12.000	BUTFLY	A	MO	O	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
FCV-25-15	E-7	3	B	12.000	BUTFLY	A	MO	O	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
FCV-25-16	E-5	3	B	12.000	BUTFLY	A	MO	O	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
FCV-25-17	E-8	3	B	12.000	BUTFLY	A	MO	O	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
FCV-25-18	C-16	3	B	6.000	BUTFLY	A	MO	O	YES	FAI	EC	QR		
											PI	2Y		
FCV-25-19	C-17	3	B	6.000	BUTFLY	A	MO	O	YES	FAI	EC	QR		
											PI	2Y		
FCV-25-24	A-16	3	B	10.000	BUTFLY	A	MO	O	YES	FAI	EC	QR		
											PI	2Y		
FCV-25-25	A-17	3	B	10.000	BUTFLY	A	MO	O	YES	FAI	EC	QR		
											PI	2Y		

P & ID: 2998-G-879 SH 3 SYSTEM: HVAC

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
FCV-25-11	H-4	2	B	16.000	BUTFLY	A	MO	C	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
FCV-25-12	J-4	2	B	16.000	BUTFLY	A	MO	C	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
FCV-25-13	I-14	2	B	12.000	BUTFLY	A	MO	C	YES	FAI	EO	QR		
											PI	2Y		
FCV-25-20	J-12	2	A	8.000	BUTFLY	A	PO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y	VR-4	& VR-16
FCV-25-21	J-11	2	A	8.000	BUTFLY	A	PO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y	VR-4	& VR-16
FCV-25-26	K-16	2	A	8.000	BUTFLY	A	PO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y	VR-4	& VR-16
FCV-25-29	K-3	2	B	4.000	BUTFLY	A	MO	C	YES	FAI	EC	QR		
											PI	2Y		
FCV-25-30	H-4	2	B	20.000	BUTFLY	A	MO	C	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
FCV-25-31	J-4	2	B	20.000	BUTFLY	A	MO	C	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
FCV-25-32	H-4	2	B	30.000	BUTFLY	A	MO	O	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		
FCV-25-33	J-4	2	B	30.000	BUTFLY	A	MO	O	YES	FAI	EC	QR		
											EO	QR		
											PI	2Y		

P & ID: 2998-G-879 SH 3 (cont) SYSTEM: HVAC

VALVE NUMBER	COORD.	CL	CAT.	SIZE	TYPE	A/P	ACT. TYPE	NORM POS.	REM IND	FAIL MODE	EXAM	TEST FREQ	RELIEF REQ.	REMARKS
FCV-25-34	H-2	2	B	4.000	BUTFLY	A	MO	C	YES	FAI	EC	QR		
											PI	2Y		
FCV-25-36	K-15	2	A	8.000	BUTFLY	A	PO	C	YES	FC	EC	QR		
											FS	QR		
											PI	2Y		
											SLT-1	2Y	VR-4	& VR-16
V-25-23	J-4	2	C	24.000	CHECK	A	S/A	C	NO		CV/O	QR		
V-25-24	H-4	2	C	24.000	CHECK	A	S/A	C	NO		CV/O	QR		

Appendix D

Valve Program
Requests for Relief

[illegible]

RELIEF REQUEST NO. VR-1

SYSTEM:

Various

COMPONENTS:

Any valves tested during cold shutdown conditions.

CATEGORY:

Various

FUNCTION:

Various

SECTION XI REQUIREMENT:

Valves shall be exercised ... unless such operation is not practical during plant operation. If only limited operation is practical during plant operation, the valve shall be part-stroke exercised during plant operation and full stroke exercised during cold shutdowns. Full stroke exercising during cold shutdowns for all valves not full-stroke exercised during plant operation shall be on a frequency determined by the intervals between shutdowns as follows:
For intervals of 3 months or longer - exercise during each shutdown. (IWV-3412, IWV-4315 and IWV-3522)

BASIS FOR RELIEF:

In many instances testing of all valves designated for testing during cold shutdown cannot be completed due to the brevity of an outage or the lack of plant conditions needed for testing specific valves. It has been the policy of the NRC that if testing commences in a reasonable time and reasonable efforts are made to test all valves, then outage extension or significant changes in plant conditions are not required when the only reason is to provide the opportunity for completion of valve testing.

ASME/ANSI OMa-1987, Operation and Maintenance Of Nuclear Power Plants, Part 10 (Paragraphs 4.2.1.2 and 4.3.2.2) recognizes this issue and allows deferred testing as set forth below.

RELIEF REQUEST NO. VR-1 (cont.)

ALTERNATE TESTING:

For those valves designated to be exercised or tested during cold shutdown, exercising shall commence as soon as practical after the plant reaches a stable cold shutdown condition, as defined by the applicable Technical Specification, but no later than 48 hours after reaching cold shutdown. If the outage is sufficiently long enough for the testing of all the cold shutdown valves, then the 48-hour requirement need not apply. If the 48-hour requirement is waved, then all cold shutdown valves must be tested during the outage.

Valve testing need not be performed more often than once every three (3) months except as provided for in IWV-3417(a). Completion of all valve testing during a cold shutdown outage is not required if the length of the shutdown period is insufficient to complete all testing. Testing not completed prior to startup may be rescheduled for the next shutdown in a sequence such that the test schedule does not omit nor favor certain valves or groups of valves.

The program tables identify those valves to which cold shutdown testing applies. Refer to Appendix E for discussion of the reasons and justification for allowing cold shutdown vs. quarterly testing.

RELIEF REQUEST NO. VR-2

SYSTEM:

Safety Injection (2998-G-078, Sh. 131 & 132)

COMPONENTS:

V-3217	V-3227	V-3237	V-3247
V-3258	V-3259	V-3260	V-3261
V-3215	V-3225	V-3235	V-3245
V-3524	V-3525	V-3526	V-3527

CATEGORY:

A/C (Check Valves)

FUNCTION:

These check valves open to provide for high-pressure and low-pressure safety injection to the RCS. Each of these valves is designated as a pressure isolation valve (PIV) and provides isolation of safeguard systems from the RCS.

SECTION XI REQUIREMENT:

The leakage rate for valves 6-inches or greater shall be evaluated per Subsection IWV-3427(b). (IWV-3521)

BASIS FOR RELIEF:

Leak testing of these valves is primarily for the purpose of confirming their capability of preventing overpressurization and catastrophic failure of the safety injection piping and components. In this regard, special leakage acceptance criteria is established and included in the St. Lucie 2 Technical Specifications (Table 3.4-1) that addresses the question of valve integrity in a more appropriate manner for these valves. Satisfying both the Technical Specification and the Code acceptance criteria is not warranted and implementation would be difficult and confusing. Specifically applying the trending requirements of IWV-3427 (b) would result in frequent and excessive maintenance of these valves. The continuation of a strict leakrate acceptance criteria and more frequent testing than specified by the Code gives a high degree of assurance that these valves will satisfactory perform their safety function.

[illegible]

RELIEF REQUEST NO. VR-2 (cont.)

ALTERNATE TESTING:

The leakage rate acceptance criteria for these valves will be established per the St. Lucie Unit 2 Technical Specifications, Table 3.4-1. Leakage rates greater than 1.0 gpm are unacceptable.

Each of the Reactor Coolant System Pressure Isolation Valve check valve shall be demonstrated operable by verifying leakage to be within its limits:

1. At least once per 18 months.

2. Prior to entering MODE 2 whenever the plant has been in COLD SHUTDOWN for 72 hours or more and if leakage testing has not been performed in the previous 9 months.

3. Prior to returning the valve to service following maintenance, repair or replacement work on the valve.

4. Following flow through valve(s) while in MODES 1,2,3, or 4:

   A. Within 24 hours by verifying valve closure, and

   B. Within 31 days by verifying leakage rate.

5. Following flow through valve(s) while in MODES 5 or 6:

   A. Within 24 hours of entering MODE 4 by verifying valve closure, and

   B. Within 31 days of entering MODE 4 by verifying leakage rate.

[illegible]

[illegible]

[illegible]

[illegible]

RELIEF REQUEST NO. VR-3

SYSTEM:

Various

COMPONENTS:

Various

CATEGORY:

Various

FUNCTION:

This is a generic request for relief

SECTION XI REQUIREMENT:

If, for power-operated valves, an increase in stroke time of 50% or more for valves with full-stroke times less than or equal to 10 seconds is observed, the test frequency shall be increased to once each month until corrective action is taken, at which time the original test frequency shall be resumed (IWV-3417(a))

BASIS FOR RELIEF:

The stroke time measurements taken during testing of fast-acting valves (those less than 2 seconds) are subject to considerable variation due to conditions unrelated to the material condition of the valve (eg. test conditions, operator reaction time). In accordance with Generic Letter 89-04, Position 6, an alternate method of evaluating stroke times is considered acceptable.

ALTERNATE TESTING:

The stroke time evaluation for those valves designated in the Plant Test Procedures as "fast-acting" will not account for successive increases of measured stroke time per IWV-3417(a) with the change in test frequency as required. In lieu of this, the assigned maximum limiting value of stroke time will be established at 2 seconds. Upon exceeding the 2-second limit, the valve will be declared inoperable and corrective action taken in accordance with IWV-3417(b).

RELIEF REQUEST NO. VR-4

SYSTEM:

Primary Containment

COMPONENTS:

PENETRATION NO.	DRAWING NO.	VALVES
10	2998-G-878	FCV-25-4 and Blank Flange
11	2998-G-878	FCV-25-2 and FCV-25-3
23	2998-G-083	HCV-14-1 and HCV-14-7
24	2998-G-083	HCV-14-2 and HCV-14-6
41	2998-G-078 Sh 130	SE-03-2A and SE-03-2B
54	2998-G-091	V-00101 and Blank Flange
56	2998-G-879	FCV-25-36 and FCV-25-26
57	2998-G-879	FCV-25-20 and FCV-25-21

CATEGORY:

A or A/C

FUNCTION:

These valves are closed to provide containment isolation.

SECTION XI REQUIREMENT:

Category A valves shall be seat leak tested and a maximum permissible leakage rate shall be specified. Individual valve leakage rates shall be evaluated per IWV-3426 and IWV-3427. (IWV-3426, IWV-3427, NRC Generic Letter 89-04)

BASIS FOR RELIEF:

For several containment systems, individual leakage rate tests are impractical due to the configuration of the system's piping and components. In these cases it is customary to perform leakage tests with the test volume between valves in series or behind valves in parallel paths.

[illegible] CONTINUE [illegible]

RELIEF REQUEST NO. VR-4 (cont.)

BASIS FOR RELIEF (cont.):

In these cases where individual valve testing is impractical, the valves will be leak tested simultaneously in multiple valve arrangements. A maximum permissible leakage rate will be applied to each combination of valves or valve and blank flange. In each of the valve pairs, the two valves are equal in size and type, and the leakage limit is in proportion to their size. The blank flanges used in testing penetrations 10 and 54 have diameters similar in size to their associated valves FCV-25-4 and V-00101. The leakage limit assigned to each pair is such that excessive leakage through any valve, or flange, would be detectable and the appropriate corrective action taken.

ALTERNATE TESTING:

The above stated valves and blank flanges will be leak rate tested in pairs. Leakage measurements from tests of multiple valves or blank flanges will be evaluated in accordance with IWV-3426 and IWV-3427.

RELIEF REQUEST NO. VR-5

SYSTEM:

Chemical and Volume Control (2998-G-078 Sh 121)

COMPONENTS:

V-2177
V-2190
V-2191
V-2526

CATEGORY:

C

FUNCTION:

V-2177 and V-2526 open to provide a flowpath for emergency boration from the boric acid makeup pumps to the suction of the charging pumps. Likewise, V-2190 opens to provide a flowpath for emergency boration via gravity drain from the boric acid makeup tanks to the suction of the charging pumps. V-2190 closes to prevent recirculation to the boric acid makeup tanks when the boric acid makeup pumps are in operation. Valve V-2191 opens to provide a flow path from the refueling water tank (RWT) to the suction of the charging pumps as an alternate supply of borated water for boration.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF

Testing these valves in the open direction requires the introduction of highly concentrated boric acid solution from the boric acid makeup tanks to the suction of the charging pumps. This, in turn, would result in the addition of excess boron to the RCS. This rapid insertion of negative reactivity would result in a rapid RCS cooldown and depressurization. A large enough boron addition could result in an unscheduled plant trip and a possible initiation of the Safety Injection Systems.

RELIEF REQUEST NO. VR-5 (cont.)

BASIS FOR RELIEF (cont.):

During cold shutdown, the introduction of excess quantities of boric acid into the RCS is undesirable from the aspect of maintaining proper plant chemistry and the inherent difficulties that may be encountered during the subsequent startup due to over-boration of the RCS. The waste management system would also be overburdened by the large amounts of RCS coolant that would require processing to decrease the boron concentration. Since the boron concentration is increased for shutdown margin prior to reaching cold shutdown, a part stroke exercise of these valves could be performed at that time.

ALTERNATE TESTING:

Check valve V-2190 will be verified closed quarterly.

All of the check valves will be part stroke exercised during each cold shutdown per VR-1 and full stroke exercised during each reactor refueling outage.

RELIEF REQUEST NO. VR-6

SYSTEM:

Chemical and Volume Control System (2998-G-078, Sh 121)

COMPONENT:

V-2443
V-2444

CATEGORY:

C

FUNCTION:

These valves open to provide a flow path from the boric acid makeup pumps to the emergency boration header.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Full-stroke testing these valves requires operating the boric acid makeup pumps at or near rated flow and verifying full accident flow through each valve. Such testing would cause the introduction of highly concentrated boric acid solution from the boric acid makeup tanks to the suction of the charging pumps. This, in turn, would result in the addition of excess boron to the RCS. This rapid insertion of negative reactivity would result in a rapid RCS cooldown and depressurization. A large enough boron addition would result in an unscheduled plant trip and a possible initiation of Safety Injection Systems.

During cold shutdown, the introduction of excess quantities of boric acid into the RCS is undesirable from the aspect of maintaining proper plant chemistry and the inherent difficulties that may be encountered during the subsequent startup due to over-boration of the RCS. The waste management system would be overburdened by the large amounts of RCS coolant that would require processing to decrease its boron concentration.

RELIEF REQUEST NO. VR-6 (cont.)

BASIS FOR RELIEF (cont.):

A second circuit that recirculates water to the RWT has flow rate measuring instrumentation installed however it is limited to 30 gpm. During an accident, either pump's discharge check valve must be able to pass a minimum flow capable of matching the demand of the two running charging pumps (greater than 80 gpm.).

ALTERNATE TESTING:

Each of these valves will be partial stroke exercised quarterly.

During testing of the boric acid makeup pumps performed during each reactor refueling (See Relief Request PR-5), system flow rate will be measured to verify full stroke of these valves.

RELIEF REQUEST NO. VR-7

SYSTEM:

Safety Injection (2998-G-078 Sh 130)

COMPONENTS:

V-07000
V-07001

CATEGORY:

C

FUNCTION:

These valves open to provide flow paths from the RWT to the suction of the associated low-pressure safety injection pump.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Full stroke exercising these valves to the open position requires injection into the RCS via the LPSI pumps . During plant operation this is precluded because the LPSI pumps cannot develop sufficient discharge pressure to overcome primary system pressure. At cold shutdown, the shutdown cooling system cannot provide sufficient letdown flow to the RWT to accommodate full design flow from the RWT while maintaining the necessary core cooling function. Thus, the only practical opportunity for testing these valves is during refueling outages when water from the RWT is used to fill the refueling cavity.

[illegible]

[illegible]

RELIEF REQUEST NO. VR-7 (cont.)

ALTERNATE TESTING:

These valves will be partial-flow exercised during quarterly testing of the LPSI pumps via the minimum flow circuit and full-flow exercised during each reactor refueling outage.

[illegible]

[illegible]

[illegible]

[illegible]

RELIEF REQUEST NO. VR-8

SYSTEM:

Safety Injection (2998-G-078 Sh 130)

COMPONENTS:

V-3401
V-3410

CATEGORY:

C

FUNCTION:

These valves open to provide flow paths from the RWT and the containment sump to the suction of the associated high-pressure safety injection pumps (HPSI).

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Full stroke exercising these valves to the open position requires injection via the HPSI pumps into the RCS. During plant operation this is precluded because the HPSI pumps cannot develop sufficient discharge pressure to overcome primary system pressure. During cold shutdown conditions, operation of the HPSI pumps is restricted to preclude RCS system pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.

RELIEF REQUEST NO. VR-8 (cont.)

ALTERNATE TESTING:

These valves will be partial-flow exercised during quarterly testing of the HPSI pumps via the minimum flow circuit and full-flow exercised during each reactor refueling outage.

This alternate testing satisfies the requirement of Generic Letter 89-04, Position 1.

RELIEF REQUEST NO. VR-9

SYSTEM:

Safety Injection (2998-G-078 Sh 130)

COMPONENTS:

V-3414
V-3427

CATEGORY:

C

FUNCTION:

These valves open to provide flow paths from the respective HPSI pumps to the high-pressure safety injection headers. They close to prevent recirculation through an idle pump.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Full stroke exercising these valves to the open position requires injection into the RCS via the HPSI pumps. During plant operation this is precluded because the HPSI pumps cannot develop sufficient discharge pressure to overcome primary system pressure. During cold shutdown conditions, operation of the HPSI pumps is restricted to preclude RCS system pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.

Partial flow exercising of these valves is performed whenever its associated HPSI pump is used to refill a SI Tank. The acceptable SI Tank level band specified by the Technical Specification is very narrow. The SI Tanks are only refilled on an as needed basis; therefore, the partial flow test cannot readily be incorporated into a quarterly test.

RELIEF REQUEST NO. VR-9 (cont.)

ALTERNATE TESTING:

These valves will be verified closed quarterly and full-flow exercised to the open position during each reactor refueling outage.

These valves will be part-stroked open while refilling a SIT as plant conditions warrant.

RELIEF REQUEST NO. VR-10

SYSTEM:

Safety Injection (2998-G-078 Sh 130)

COMPONENTS:

V-3522
V-3547

CATEGORY:

C

FUNCTION:

These valves open to provide flow paths from the high-pressure safety injection pumps to the RCS for hot-leg injection.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Full stroke exercising of these valves would require operating a high pressure safety injection (HPSI) pump and injecting into the reactor coolant system through the hot leg injection system. At power operation this is not possible because the HPSI pumps do not develop sufficient discharge pressure to overcome reactor coolant system pressure. During cold shutdown conditions, operation of the HPSI pumps is restricted to preclude RCS system pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.

RELIEF REQUEST NO. VR-10

ALTERNATE TESTING:

At least once during each reactor refueling outage these valves will be full-stroke exercised to the open position.

This alternate testing satisfies the requirement of Generic Letter 89-04, Position 1.

RELIEF REQUEST NO. VR-11

SYSTEM:

Safety Injection (2998-G-078 Sh 131)

COMPONENTS:

V-3113
V-3133
V-3143
V-3766

CATEGORY:

C

FUNCTION:

These valves open to provide flow paths from the high-pressure safety injection headers to the RCS.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Full stroke exercising of these valves would require operating a high pressure safety injection (HPSI) pump at nominal accident flow rate and injecting into the reactor coolant system. At power operation this is not possible because the HPSI pumps do not develop sufficient discharge pressure to overcome reactor coolant system pressure. During cold shutdown conditions, operation of the HPSI pumps is restricted to preclude RCS system pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.

Partial flow exercising of these valves is performed whenever its associated SI Tank is refilled. The acceptable SI Tank level band specified by the Technical Specification is very narrow. The SI Tanks are only refilled on an as needed basis; therefore, the partial flow test cannot readily be incorporated into a quarterly test.

RELIEF REQUEST NO. VR-11 (cont.)

ALTERNATE TESTING:

These valves will be partial flow exercised when ever its associated SI Tank is filled.

At least once during each reactor refueling outage these valves will be full-stroke exercised to the open position.

RELIEF REQUEST NO. VR-12

SYSTEM:

Safety Injection (2998-G-078 Sh 131)

COMPONENTS:

V-3524
V-3525
V-3526
V-3527

CATEGORY:

A/C

FUNCTION:

These valves open to provide flow paths from the high-pressure safety injection pumps to the RCS for hot leg injection and close to isolate the safety injection headers from the high pressure of the reactor coolant system.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Full stroke exercising of these valves would require operating a high pressure safety injection (HPSI) pump at nominal accident flow rate and injecting into the reactor coolant system. At power operation this is not possible because the HPSI pumps do not develop sufficient discharge pressure to overcome reactor coolant system pressure. During cold shutdown conditions, operation of the HPSI pumps is restricted to preclude RCS system pressure transients that could result in exceeding the pressure-temperature limits specified in the Technical Specifications, Section 3.4.9.

RELIEF REQUEST NO. VR-12 (Cont.)

BASIS FOR RELIEF (cont.):

These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or back flow test. Performing leak tests of V-3524 and V-3526 involves a considerable effort. The test connection for these valves are located in a high radiation area in the pipe penetration room, and one of the two connections is located over 12 feet above the floor. Testing during operation or at each cold shutdown outage would constitute an unreasonable burden on the plant staff.

The other check valves, V-3525 and V-3527, have upstream pressure alarms. Should either valve leak by, the pressure instruments would detect the increase and alarm in the control room when the alarm setpoint is exceeded.

ALTERNATE TESTING:

These valves will be full-stroke exercised to the open position at least once during each reactor refueling outage. This satisfies the requirements of Generic Letter 89-04, Position 1.

At least once every 18 months these valves will be verified to close in conjunction with PIV leak testing (see VR-2). In addition, V-3525 and V-3527 will be leak tested if the upstream pressure monitors indicate alarm during normal operation.

RELIEF REQUEST NO. VR-13

SYSTEM:

Safety Injection (2998-G-078 Sh 132)

COMPONENTS:

V-3215
V-3225
V-3235
V-3245

CATEGORY:

A/C

FUNCTION:

These valves open to provide flow paths from the safety injection tanks to the RCS and close to isolate the tanks from the high pressure of the reactor coolant system and the safety injection headers.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Full stroke exercising of these valves would require injecting from a tank under nominal pressure into a de-pressurized reactor coolant system. At power operation this is not possible because the SI Tank pressure is insufficient to overcome reactor coolant system pressure.

Under a large break LOCA accident conditions, the maximum (peak) flow rate through these valves would be approximately 20,000 gpm. During cold shutdown or refueling the required test conditions for developing this full accident flow cannot be established.

[illegible]

RELIEF REQUEST NO. VR-13 (Cont.)

BASIS FOR RELIEF (cont.):

The SIT discharge isolation valves are motor operated valves with a nominal stroke time of 52 seconds. Therefore, the isolation valve cannot be used to simulate the LOCA flow conditions by opening it with a full or partially pressurized SIT. The discharge flow rate would only increase gradually due to the long stroke time of the discharge isolation valve. The flow rate would not be anywhere near the expected peak blowdown rate of 20,000 gpm. expected during a large break LOCA.

FP&L has reviewed the operating and maintenance history of these valves and similar valves used throughout the industry under comparable conditions. Based on these reviews, there is no evidence of valve degradation with respect to their ability to open and satisfactorily pass the required flow. It is apparent from the failure data that the primary mode of failure is related to valve leakage - both past the seat and external through the body-bonnet and hinge pin gasket joints. It should also be noted that these valves are not subjected to any significant flow during plant operation as well as maintenance periods; thus it is unlikely that these valves would experience any service-related damage or wear.

Although check valve disassembly is a valuable maintenance tool that can provide a great deal of information about a valve's internal condition, due to the difficulties associated with these maintenance activities, it should only be performed under the maintenance program at a frequency commensurate with the valve type and service. In this light, FP&L considers the frequency of inspection for these valves of once each 10-year inspection interval to be adequate to ensure the continued operability of these valves.

These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or back flow test. The back flow tests are performed as part of the pressure isolation testing per VR-2.

RELIEF REQUEST NO. VR-13 (cont.)

ALTERNATE TESTING:

At least once during each ISI (10 year) inspection interval each of these valves will be disassembled, inspected, and manually stroked to verify operability. Should a valve under inspection be found to be inoperable, then the remaining three valves will be inspected during the same outage. Assurance of proper reassembly will be provided by performing a leak test or partial-flow test prior to returning a valve to service following disassembly.

These valves will be verified closed in conjunction with PIV leak testing. See VR-2 for PIV testing frequency.

RELIEF REQUEST NO. VR-14

SYSTEM:

Safety Injection (2998-G-078 Sh 132)

COMPONENTS:

V-3217
V-3227
V-3237
V-3247

CATEGORY:

A/C

FUNCTION:

These valves open to provide flow paths from the safety injection headers to the RCS and close to isolate the headers from the high pressure of the reactor coolant system.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Full stroke exercising of these valves would require injecting from a tank under nominal pressure into a de-pressurized reactor coolant system. At power operation this is not possible because the SI Tank pressure is insufficient to overcome reactor coolant system pressure.

Under a large break LOCA accident conditions, the maximum (peak) flow rate through these valves would be approximately 20,000 gpm. During cold shutdown or refueling the required test conditions for developing this full accident flow cannot be established.

RELIEF REQUEST NO. VR-14 (Cont.)

BASIS FOR RELIEF (cont.):

The SIT discharge isolation valves are motor operated valves with a nominal stroke time of 52 seconds. Therefore, the isolation valve cannot be used to simulate the LOCA flow conditions by opening it with a full or partially pressurized SIT. The discharge flow rate would only increase gradually due to the long stroke time of the discharge isolation valve. The flow rate would not be anywhere near the expected peak blowdown rate of 20,000 gpm. expected during a large break LOCA.

FP&L has reviewed the operating and maintenance history of these valves and similar valves used throughout the industry under comparable conditions. These four valves have been in operation in Unit 2 since the plant startup in 1983. A total of 2 plant work orders have been initiated for work on these valves. Of the two work orders, one was to repair seat leakage identified by a seat leakage test and the other was for disassembly and inspection per Generic Letter 89-04. A search of the Nuclear Plant Reliability Data System for problems with valves similar to these revealed 12 reports - 7 due to seat leakage and the remaining 5 were related to gasket leaks. Based on these reviews there is no evidence of valve degradation with respect to their ability to open and satisfactorily pass the required flow. It is apparent from the failure data that the primary mode of failure is related to valve leakage - both past the seat and external through the body-bonnet and hinge pin gasket joints.

In order to disassemble and inspect these valves , the reactor coolant system must be placed in mid-loop or "reduced inventory" condition for several days. In response to issues raised in NRC Generic Letter 88-17, FP&L is concerned about continued operations with the plant in a condition of "reduced inventory." During these periods, the risk of over-heating the core is increased due to the higher probability of an incident where shutdown cooling is lost. This risk is compounded by the reduced volume of water available to act as a heat sink should cooling be lost. Since 1982 there have been at least six (6) reported events in the industry where cooling flow was lost while a plant was in a "reduced inventory" condition.

TABLE 10 [illegible]

RELIEF REQUEST NO. VR-14 (Cont.)

BASIS FOR RELIEF (cont.):

Although check valve disassembly is a valuable maintenance tool that can provide a great deal of information about a valve's internal condition, due to the difficulties associated with these maintenance activities, it should only be performed under the maintenance program at a frequency commensurate with the valve type and service. Given the lack of evidence that these valves are experiencing significant failures with respect to their capability of passing the design flow rates and the apparent sensitivity of the valves to leak testing, a frequency of inspection for these valves of once each 10-year inspection interval is adequate to ensure the continued operability of these valves.

These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or back flow test. The back flow testing is performed as stated in VR-2. In addition to periodic leak testing, the upstream pressure of each valve is monitored by a pressure indicator and alarm. Should any of these valves begin to leak by, the upstream pressure alarm would alert plant personnel of the leakage.

ALTERNATE TESTING:

During cold shutdown and refueling periods, each of these valves will be partial-stroke exercised with approximately 3,000 gpm (20 percent of maximum accident flow) using the LPSI pumps per Relief Request VR-1.

At least once during each ISI (10 year) inspection interval each of these valves will be disassembled, inspected, and manually stroked to verify operability. Should a valve under inspection be found to be inoperable, then the remaining three valves will be inspected during the same outage. Assurance of proper reassembly will be provided by performing a leak test or partial-flow test prior to returning a valve to service following disassembly.

These valves will be verified closed in conjunction with PIV leak testing. See VR-2 for PIV testing frequency.

RELIEF REQUEST NO. VR-15

SYSTEM:

Safety Injection (2998-G-078 Sh 132)

COMPONENTS:

V-3258 V-3260
V-3259 V-3261

CATEGORY:

A/C

FUNCTION:

These valves open to provide flow paths from the high/low pressure safety injection headers to the RCS and close to isolate the headers from the high pressure of the reactor coolant system.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Since no full flow recirculation path exists, full stroke exercising of these valves would require operating a low pressure safety injection (LPSI) pump at nominal accident flow rate and injecting into the reactor coolant system. At power operation this is not possible because the LPSI pumps do not develop sufficient discharge pressure to overcome reactor coolant system pressure.

Partial flow exercising of these valves is performed when ever its associated SI Tank is refilled. These valves are Pressure Isolation Valves which requires that they are verified closed and leak tested within 24 hours following flow through them. The acceptable SI Tank level band specified by the Technical Specification is very narrow. The SI Tanks are only refilled on an as needed basis; therefore, the partial flow test cannot readily be incorporated into a quarterly test.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

RELIEF REQUEST NO. VR-15 (cont.)

BASIS FOR RELIEF (cont.):

These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or back flow test.

ALTERNATE TESTING:

These valves will be partial flow tested and then verified closed whenever its associated SI Tank is refilled.

These valves will be full-stroke exercised to the open position during cold shutdown periods per Relief Request VR-1.

These valves will be verified closed in conjunction with PIV leak testing. See VR-2 for PIV testing frequency.

RELIEF REQUEST NO. VR-16

SYSTEM:

Primary Containment

COMPONENTS:

Valves 6-inches NPS and larger subject to leakage rate testing per 10CFR50, Appendix J.

CATEGORY:

A/C (Check Valves)
A (Motor-operated valves)

FUNCTION:

Each of these valves is designated as a containment isolation valve maintaining the leakrate integrity of the primary containment in the case of an accident.

SECTION XI REQUIREMENT:

The leakage rate for valves 6-inches nominal pipe size and larger shall be evaluated per Subsection IWV-3427(b). (IWV-3521)

BASIS FOR RELIEF:

The usefulness of applying this requirement does not justify the burden of compliance. This position is supported by the Generic Letter 89-04, Position 10.

ALTERNATE TESTING:

Leakrate test results for valves 6-inches nominal pipe size and greater will be evaluated per IWV-3426 and IWV-3427(a) however, the requirements of IWV-3427(b) will not be applied. This satisfies the requirements of Generic Letter 89-04, Position 10.

RELIEF REQUEST NO. VR-17

SYSTEM:

Waste Management (2998-G-078, Sh 163)

COMPONENT:

V-6792

CATEGORY:

A/C

FUNCTION:

This valve closes to provide primary containment for the penetration related to the nitrogen gas supply line to the containment building.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

This is a simple check valve with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or back flow test. This would require a considerable effort, including entry into the containment building. Due to access limitations this is impractical during plant operation.

ALTERNATE TESTING:

This valve will be verified to close during cold shutdowns as per VR-1.

RELIEF REQUEST NO. VR-18

SYSTEM:

Makeup Water (2998-G-084)

COMPONENT:

V-15328

CATEGORY:

A/C

FUNCTION:

This valve closes to provide primary containment for the penetration related to the makeup water supply line to the containment building.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

This is a simple check valve with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or back flow test. This would require a considerable effort, including entry into the containment building, which is impractical during plant operation.

ALTERNATE TESTING:

This valve will be verified to close during cold shutdowns as per VR-1.

At least once every two (2) years, this valve will be verified to close in conjunction with the Appendix J leak testing program.

RELIEF REQUEST NO. VR-19

SYSTEM:

Instrument Air (2998-G-085, Sh 2)

COMPONENT:

V-18195

CATEGORY:

A/C

FUNCTION:

This valve closes to provide primary containment for the penetration related to the instrument air supply line to the containment building.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

This is a simple check valve with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or back flow test. This would require a considerable effort, including entry into the containment building and securing all instrument air inside the containment. There are over 50 valves, instruments, and controllers supplied by this one line. During a normal refueling outage, an alternate instrument air compressor must be connected to the isolated section of instrument air line in order to supply air to these components during the Appendix J local leakage testing. The hose from the air compressor to the instrument air line must be routed through the containment maintenance hatch. Opening this hatch for this test alone would extend the amount of time that the unit would spend in cold shutdown, thus extending the outage. Testing of this valve would be an unreasonable burden on the plant staff to perform while in cold shutdown.

RELIEF REQUEST NO. VR-19 (cont.)

ALTERNATE TESTING:

At least once every two (2) years, this valve will be verified to close in conjunction with the Appendix J leak testing program.

[illegible]

RELIEF REQUEST NO. VR-20

SYSTEM:

Containment Spray (2998-G-088)

COMPONENTS:

V-07119
V-07120

CATEGORY:

C

FUNCTION:

These valves open to provide flow paths from the refueling water tank (RWT) to the containment spray and safety injection suction headers.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Full stroke exercising of these valves would require simultaneous operation of one HPSI pump and one LPSI pump injecting into the RCS, and one containment spray pump injecting into its spray header to verify the maximum design accident flow. Such a test is not practical during any plant operational modes.

ALTERNATE TESTING:

During quarterly pump testing each of these valves will be partial-stroke exercised via recirculation through the minimum flow test circuits of the various systems. The valves will also be partial-stroke exercised during the series of pump substantial flow tests and check valve exercises performed each refueling outage.

RELIEF REQUEST NO. VR-20 (cont.)

ALTERNATE TESTING (cont.):

During each reactor refueling outage at least one of these valves will be disassembled, inspected, and manually stroked to verify operability. Should a valve under inspection be found to be inoperable, then the other valve will be inspected during the same outage, after which the rotational inspection schedule will be re-initiated. This satisfies the requirements of Generic Letter 89-04, Position 2 and, as such, is considered to be approved upon submittal.

RELIEF REQUEST NO. VR-21

SYSTEM:

Containment Spray (2998-G-088)

COMPONENTS:

V-07129
V-07143

CATEGORY:

C

FUNCTION:

These valves open to provide flow paths from the respective containment spray pump to the containment spray headers.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Full stroke exercising of these valves would require operating each containment spray pump at nominal accident flow rate. Since exercising these valves through the normal containment spray flow path would result in spraying down the containment, the only practical flow path available for such a test requires pumping water from the RWT to the RCS via the shutdown cooling loops. At cold shutdown, the shutdown cooling system cannot provide sufficient letdown flow to the RWT to accommodate full design flow from the RWT while maintaining the necessary core cooling function.

ALTERNATE TESTING:

Each of these valves will be partial-stroke exercised quarterly in conjunction with testing of the containment spray pumps via the minimum flow test line.

RELIEF REQUEST NO. VR-21 (cont.)

ALTERNATE TESTING (cont.):

During each refueling outage, each valve will be exercised at least once to demonstrate full stroke capability. The containment spray pump will take suction from the RWT and discharge into the refueling cavity via the shutdown cooling system.

RELIEF REQUEST NO. VR-22

SYSTEM:

Containment Spray (2998-G-088)

COMPONENTS:

V-07172
V-07174

CATEGORY:

C

FUNCTION:

These valves open to provide flow paths from the containment sump to the containment spray and safety injection suction headers during recirculation.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

There are no provisions for exercising these valves. In order to pass full flow through these valves, the containment sump would have to be flooded. One SI Train of pumps (HPSI, LPSI, and Cont. Spray) would then have to be operated at full flow. As stated in VR-21, runnig all three SI pumps at full flow is not posible.

ALTERNATE TESTING:

During each reactor refueling outage at least one of these valves will be disassembled, inspected, and manually stroked to verify operability. Should a valve under inspection be found to be inoperable, then the other valve will be inspected during the same outage, after which the rotational inspection schedule will be re-initiated. This satisfies the requirements of Generic Letter 89-04, Position 2 and, as such, is considered to be approved upon submittal.

RELIEF REQUEST NO. VR-23

SYSTEM:

Containment Spray (2998-G-088)

COMPONENTS:

V-07192
V-07193

CATEGORY:

C

FUNCTION:

These valves open to provide flow paths from the respective containment spray headers to the containment spray rings.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Full stroke exercising of these valves would require operating each containment spray pump at nominal accident flow rate. Since exercising these valves through the normal containment spray flow path would result in spraying down the containment, this is considered impractical.

Since flow through these valves is not posible, non-intrusive test methods, should they become approved, would not work on these check valves.

RELIEF REQUEST NO. VR-23 (cont.)

ALTERNATE TESTING:

During each reactor refueling outage at least one of these valves will be disassembled, inspected, and manually stroked to verify operability. Should a valve under inspection be found to be inoperable, then the other valve will be inspected during the same outage, after which the rotational inspection schedule will be re-initiated. This satisfies the requirements of Generic Letter 89-04, Position 2 and, as such, is considered to be approved upon submittal.

RELIEF REQUEST NO. VR-24

SYSTEM:

Containment Spray (2998-G-088)

COMPONENTS:

V-07256
V-07258

CATEGORY:

C

FUNCTION:

These valves open to provide flow paths from the hydrazine pumps to the respective containment spray pump suction header.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Testing these valves using the only flow path available (via the hydrazine pumps) would contaminate the containment spray system and refueling water tank with hydrazine. Each of the hydrazine pumps discharge through its check valve into the suction piping of its containment spray pump. The hydrazine would then be pumped to the RWT during the quarterly containment spray pump Code test using the mini-flow recirculation line. Continued testing would build up the concentration of hydrazine in the RWT and deplete the level in its storage tank.

ALTERNATE TESTING:

During each reactor refueling outage these valves will be flow tested.

RELIEF REQUEST NO. VR-25

SYSTEM:

Miscellaneous Sampling (2998-G-092 SH 1)

COMPONENT:

V-27101
V-27102

CATEGORY:

A/C

FUNCTION:

These valves close to provide primary containment.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

These are simple check valves with no external means of position indication, thus the only practical means of verifying closure is by performing a leak test or back flow test. This would require a considerable effort, including entry into the containment building, which is impractical and would be an unreasonable burden on the plant staff to perform during operation. In order to perform back flow testing on these valves, the system must be breached by removing capped vents in the tubing. This action would result in only a single containment isolation boundary for these penetrations. This situation cannot be allowed while containment integrity is required. Therefore, the plant must be in either Mode 5 or Mode 6 to perform this test.

ALTERNATE TESTING:

These valves will be exercised open once each quarter.

At least once every cold shutdown, these valves will be verified to close. Leak testing per Appendix J during refueling outages satisfy the valve closure test.

RELIEF REQUEST NO. 25 (cont.)

ALTERNATE TESTING: (cont.)

At least once every 2 years, these valves will be leak tested in conjunction with the Appendix J leak testing program.

RELIEF REQUEST NO. VR-26

SYSTEM:

Emergency Diesel Generator Air Start System
(2998-G-096, Sh 1&2)

COMPONENTS:

FCV-59-1A1 thru FCV-59-4A1
FCV-59-1B1 thru FCV-59-4B1
SE-59-3A thru SE-59-6A
SE-59-3B thru SE-59-6B

CATEGORY:

B

FUNCTION:

These valves open to supply starting air to the emergency diesel generators.

SECTION XI REQUIREMENT:

The stroke time of all power operated valves shall be measured to the nearest second, ..., whenever such a valve is full-stroke tested. (IWV-3413(b))

BASIS FOR RELIEF:

These valves are integral with the diesel air start system for each emergency diesel generator. These valves have no valve position indication mechanism and, as such, there is no practical method for measuring the stroke times of each individual valve. If one of these valves were to fail to stroke, one of the four pairs of air start motors would fail to operate. Since one pair of air start motors is able to start the diesel generator, the diesel generator air start system has a redundancy of four for these valves.

RELIEF REQUEST NO. VR-26 (cont.)

BASIS FOR RELIEF (cont.):

The surveillance for starting and running each diesel generator is performed each month. The air start motor surveillance is performed every 6 months. This surveillance isolates three of the air start motor pairs and the fourth pair has air throttled to it. A diesel generator start signal is manually inserted and the un-isolated motor pair is observed for proper operation. The process is repeated for the other three pairs. The 6 month surveillance frequency was chosen to maximize the system reliability while minimizing the amount of time the diesel generators are maintained out of service for surveillances.

ALTERNATE TESTING:

These valves will be exercised in conjunction with testing of the emergency diesel generators. Both the 2A and 2B diesel generators will be started each month. Every 6 months, these 16 air start system valves will be tested for proper operation by observing the operation of each associated pair of air start motors. The stroke times of the individual valves will not be measured.

RELIEF REQUEST NO. VR-27

SYSTEM:

Feedwater System (2998-G-080, Sh 2)

COMPONENTS:

V-9303
V-9304
V-9305

CATEGORY:

C

FUNCTION:

These valves open to provide flow paths from the auxiliary feedwater pump discharge to the condensate storage tank to ensure adequate pump cooling during low flow conditions.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

There is no flow rate instrumentation available to verify valve full-stroke exercising of these valves as required by Generic Letter 89-04, Position 1.

ALTERNATE TESTING:

During quarterly pump testing each of these valves will be partial-stroke exercised via recirculation through the minimum flow test circuits with no flow measurements.

RELIEF REQUEST NO. VR-27 (cont.)

ALTERNATE TESTING (cont.):

During each reactor refueling outage at least one of these valves will be disassembled, inspected, and manually stroked to verify operability. Should a valve under inspection be found to be inoperable, then the other two valves will be inspected during the same outage, after which the rotational inspection schedule will be re-initiated. This satisfies the requirements of Generic Letter 89-04, Position 2.

RELIEF REQUEST NO. VR-28

SYSTEM:

Safety Injection System (2998-G-078, Sh 130)

COMPONENTS:

V-3104
V-3105

CATEGORY:

C

FUNCTION:

These valves open to provide for mini-flow recirculation flow paths from the low pressure safety injection pumps to the refueling water tank. This minimum flow through the respective pumps removes pump heat in the event they are operating under low or no flow conditions. The valves close during shutdown cooling and long-term recirculation to prevent recirculation through the idle pump(s).

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

There is no flow rate instrumentation available to verify valve full-stroke exercising as required by Generic Letter 89-04, Position 1.

ALTERNATE TESTING:

During quarterly pump testing each of these valves will be partial-stroke exercised (open) via recirculation through the minimum flow test circuits with no flow measurements.

RELIEF REQUEST NO. VR-28 (cont.)

ALTERNATE TESTING (cont.):

During cold shutdown, these valves will be back flow tested.

During each reactor refueling outage these two valves will be flow tested. The test will calculate the flow through the mini-flow line by draining the RCS through the line while observing the Pressurizer level drop or RWT level increase. The level change divided by the time can be used to verify the full flow exercise of the two check valves.

RELIEF REQUEST NO. VR-29

SYSTEM:

Safety Injection (2998-G-078, Sh. 131)

COMPONENTS:

V-3480 V-3651
V-3481 V-3652

CATEGORY:

A (Motor-operated valves)

FUNCTION:

The motor-operated valves open for residual heat removal recirculation during shutdown. Each of these valves is designated as a pressure isolation valve (PIV) and provides isolation of safeguard systems from the RCS.

SECTION XI REQUIREMENT:

The leakage rate for valves 6-inches or greater shall be evaluated per Subsection IWV-3427(b). (IWV-3521)

BASIS FOR RELIEF:

Leak testing of these valves is primarily for the purpose of confirming their capability of preventing overpressurization and catastrophic failure of the safety injection piping and components. In this regard, special leakage acceptance criteria is established and included in the St. Lucie 2 Technical Specifications (Table 3.4-1) that addresses the question of valve integrity in a more appropriate manner for these valves. Satisfying both the Technical Specification and the Code acceptance criteria is not warranted and implementation would be difficult and confusing.

RELIEF REQUEST NO. VR-29 (cont.)

ALTERNATE TESTING:

The leakage rate acceptance criteria for these valves will be established per the St. Lucie Unit 2 Technical Specifications, Table 3.4-1.

1. Leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are acceptable if the latest measured rate has not exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.

2. Leakage rates greater than 1.0 gpm, but less than or equal to 5.0 gpm, are unacceptable if the latest measured rate exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.

3. Leakage rates greater than 5.0 gpm are unacceptable.

Each Reactor Coolant System Pressure Isolation Valve motor-operated valves shall be demonstrated operable by verifying leakage to be within its limits:

1. At least once per 18 months, and

2. Prior to returning the valve to service following maintenance, repair, or replacement work on the valve.

RELIEF REQUEST NO. VR-30

SYSTEM:

Safety Injection System (2998-G-078, Sh 130)

COMPONENTS:

V-3102
V-3103

CATEGORY:

C

FUNCTION:

These valves open to provide for mini-flow recirculation flow paths from the high pressure safety injection pumps to the refueling water tank. This minimum flow through the respective pumps removes pump heat in the event they are operating under low or no flow conditions. The valves close during shutdown cooling and long-term recirculation to prevent recirculation through the idle pump(s).

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

There is no installed flow rate instrumentation available to verify valve full-stroke exercising as required by Generic Letter 89-04, Position 1.

RELIEF REQUEST NO. VR-30 (cont.)

ALTERNATE TESTING:

During quarterly pump testing each of these valves will be partial-stroke exercised (open) via recirculation through the minimum flow test circuits with no flow measurements.

During cold shutdown, these valves will be back flow tested.

During each reactor refueling outage at least one of the two HPSI pump valves will be disassembled, inspected, and manually stroked to verify operability. Inspections shall be scheduled such that valves will be checked in a rotating sequence such that each valve is subject to inspection at least once every three (3) years. Should a valve under inspection be found to be inoperable, then the other valve will be inspected during the same outage, after which the rotational inspection schedule will be re-initiated. This satisfies the requirements of Generic Letter 89-04, Position 2.

St. Lucie Unit 2 was granted a one time relief by the NRC for the disassembly of V-3103 during the 1992 refueling outage. Both check valves must be disassembled during the next refueling outage in the fall of 1993. See NRC SER letter from Herbert N. Berkow to J. H. Goldberg dated 2 June 1992.

RELIEF REQUEST NO. VR-31

SYSTEM:

Main Steam (2998-G-079, Sh 1)

COMPONENTS:

V-08130
V-08163

CATEGORY:

C

FUNCTION:

These valves open to supply steam to the 2C Auxiliary Feedwater Pump (AFW) turbine. These valves close to prevent unrestricted release of steam from an unaffected steam generator in the event of a steamline rupture upstream of an MSIV.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

There is no practical means or provision for pressurizing the piping downstream of these valves in order to verify closure of these valves.

ALTERNATE TESTING:

During the monthly test of the 2C AFW, these valves will be partial-stroke exercised. During each reactor refueling outage both of these valves will be full-stroke exercised during the AFW Pump substantial flow tests

RELIEF REQUEST NO. VR-31

ALTERNATE TESTING (cont.):

During each reactor refueling outage at least one of these valves will be disassembled, inspected, and manually stroked to verify operability. Should a valve under inspection be found to be inoperable, then the remaining other valve will be inspected during the same outage, after which the rotational inspection schedule will be re-initiated. Following valve re-assembly no testing is possible (partial-flow or leak testing) prior to placing the valves in service, thus none will be performed. This satisfies the requirements of Generic Letter 89-04, Position 2 and, as such, is considered to be approved upon submittal.

RELIEF REQUEST NO. VR-32

SYSTEM:

Safety Injection (2998-G-078, Sh 130)

COMPONENTS:

V-3101

CATEGORY:

C

FUNCTION:

This valve opens to allow flow from the SITs to the VCT. This flow path is necessary to assure sufficient water inventory for plant cooldown should the RWT become unavailable.

SECTION XI REQUIREMENT:

Check valves shall be exercised at least once every 3 months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

Lining up the SITs to discharge into the VCT would result in the introduction of highly concentrated boric acid solution to the suction of the charging pumps. This, in turn, would result in the addition of excess boron to the RCS. This rapid insertion of negative reactivity would result in a rapid RCS cooldown and depressurization. A large enough boron addition would result in an unscheduled plant trip and a possible initiation of Safety Injection Systems.

During cold shutdown, the introduction of excess quantities of boric acid into the RCS is undesirable from the aspect of maintaining proper plant chemistry and the inherent difficulties that may be encountered during the subsequent startup due to over-boration of the RCS. The waste management system would be overburdened by the large amounts of RCS coolant that would require processing to decrease its boron concentration. Therefore, only a partial flow test can be performed during cold shutdown.

RELIEF REQUEST NO. VR-32 (cont.)

ALTERNATE TESTING:

This check valve will be partial flow tested during cold shutdowns per VR-1.

The check valve will be full flow exercised once every refueling outage.

RELIEF REQUEST NO. VR-33

SYSTEM:

Feedwater (2998-G-080, Sh 2)

COMPONENTS:

SE-09-2 SE-09-3
SE-09-4 SE-09-5

CATEGORY:

B

FUNCTION:

These solenoid valves cycle open and closed during an AFAS actuation to control auxiliary feedwater flow to the steam generators.

SECTION XI REQUIREMENT:

If, for power operated valves, an increase in stroke time of 25% or more from the previous test for valves with full-stroke times greater than 10 sec. or 50% or more for valves with full-stroke times less than or equal to 10 sec is observed, test frequency shall be increased to once each month until corrective action is taken ... (IWV-3414(a))

BASIS FOR RELIEF:

These four valves are piloted, normally closed, solenoid globe valves made by the Target Rock Corporation. When their solenoid coil is energized, the magnetic force lifts the Pilot Disk, opening the Pilot Orifice in the Main Disk. Any pressure in the chamber above the Main Disk can now vent off through the Pilot Orifice to the downstream side of the valve. With the pressure vented above the Main Disk, the upstream pressure acting on the lower side of the Main Disk can now lift if off the Main Seat, rapidly opening the valve. In the absence of a pressure differential, no pressure force exists tending to seat the disc, therefore the magnetic force of the Solenoid Coil is sufficient, acting through the Stem, Pilot Disc, and Pin, to directly lift the Main Disc off the seat, opening the valve.

RELIEF REQUEST NO. VR-33 (cont.)

BASIS FOR RELIEF: (cont.)

- The stroke times measured without differential pressure are not only slower, they also vary significantly from test to test causing the valves to be placed into alert unnecessarily. Therefore, St. Lucie requests relief from IWV-3417(a), the alert trending of valve stroke times, for the quarterly stroke test.

The valves require the AFW pumps to be running and discharging into the steam generators to develop the differential pressure for the stroking of these valves. Pumping from the auxiliary feedwater into the steam generators during normal operation is impractical and undesirable. Injecting the relatively cold auxiliary feedwater into the main feedwater lines while the plant is operating at power would cause a large temperature differential (approximately 375 deg-F). Significant thermal shock and fatigue cycling of the feedwater piping and steam generator nozzles could result.

ALTERNATE TESTING:

During quarterly testing, these valves will be exercised and fail tested during which their stroke times will be recorded. However, the valves' stroke times will not be trended for alert testing. If the maximum allowed stroke time is exceeded, then the valves will be placed out of service.

Testing performed during cold shutdown will record and trend the valves' stroke times. Should a valve's stroke time exceed its alert limit, it will be placed in alert and will be addressed prior to startup. Cold shutdown testing will be conducted per VR-1

RELIEF REQUEST NO. VR-34

SYSTEM:

Component Cooling Water (2998-G-083)

COMPONENTS:

TCV-14-4A
TCV-14-4B

CATEGORY:

B

FUNCTION:

These control valves regulate the amount of Intake Cooling Water flowing through the Component Cooling System heat exchangers. In the event of failure, these valves will fail open.

SECTION XI REQUIREMENT:

If, for power operated valves, and increase in stroke time of 25% or more from the previous test for valves with full-stroke times greater than 10 sec. or 50% or more for valves with full-stroke times less than or equal to 10 sec is observed, test frequency shall be increased to once each month until corrective action is taken ... (IWV-3414(a))

BASIS FOR RELIEF:

These two valves are operated via air signals from their temperature controllers. The valves can be operated by placing their controllers in manual and varying the air signal from the controllers. However, due to the response times of the controllers, the valve stroke times vary from test to test sufficiently to place the valves into alert occasionally. The valves can also be operated by closing the valve manually using the controller and then isolating and then venting the control air signal to the valves. The time it takes to isolate and then vent the control air is dependant upon the operator performing the test.

RELIEF REQUEST NO. VR-34 (cont.)

BASIS FOR RELIEF: (cont.)

The rate that the air is vented has a direct affect on the valves' stroke times. The stroke times vary from test to test sufficiently to place the valves into alert occasionally. Therefore, St. Lucie requests relief from IWV-3417(a), the alert trending of valve stroke times.

ALTERNATE TESTING:

Both of these valves will be exercised and fail tested quarterly during which their stroke times will be recorded. However, the valves will not be trended for alert testing. If their stroke times exceed the maximum allowed stroke time, then the valves will be placed out of service.

Appendix E

Valve Program
Cold Shutdown Justifications

Appendix E: COLD SHUTDOWN JUSTIFICATIONS

This appendix is intended to provide the justification for performing valve exercising only at cold shutdown conditions as permitted by IWV-3412(a), 3415 and 5322. Specifically included in this category are the following:

* A valve whose failure in a position other than its normal position could jeopardize the immediate safety of the plant or system components;

* A valve whose failure in a position other than its normal position could cause all trains of a safeguard system to be inoperable;

* A valve whose failure in a position other than its normal position that might cause a transient that could lead to a plant trip; or

* When test requirements or conditions are precluded by system operation or access.

Cold shutdown testing is performed under conditions outlined in Relief Request VR-1.

<u>Reactor Coolant (2998-G-078, Sh 107)</u>

V-1460 thru V-1466
Reactor Coolant System Gas Vents

These valves are administratively controlled in the key-locked closed position with the power supply disconnected to prevent inadvertent operation. Since these are Class 1 isolation valves for the reactor coolant system, failure of a valve to close or significant leakage following closure could result in a loss of coolant in excess of the limits imposed by Technical Specification 3.1.3 leading to a plant shutdown. Furthermore, if a valve were to fail open or valve indication fail to show the valve returned to the fully closed position following exercising, prudent plant operation would probably likely result in a plant shutdown.

<u>Reactor Coolant (2998-G-078, Sh 108)</u>

V-1474 and V-1475
Power-Operated Relief Valves

Due to the potential impact of the resulting transient should one of these valves open prematurely or stick in the open position, it is considered imprudent to cycle them during plant operation with the reactor coolant system pressurized.

<u>Chemical & Volume Control (2998-G-078 Sh. 120)</u>

V-2522
Letdown Line Containment Isolation Valve

Closing this valve during operation isolates the letdown line from the RCS and would result in undesirable pressurizer level transients with the potential for a plant trip. If a valve failed to reopen, then an unexpected plant shutdown would be required.

<u>Chemical & Volume Control (2998-G-078 Sh. 121)</u>

V-2501
Volume Control Tank Outlet Valve

Closing this valve during operation of a charging pump would isolate the VCT from the charging pump suction header damaging any operating charging pumps and interrupting the flow of charging water flow to the RCS with the potential of RCS transients and plant trip.

V-2504
RWT Discharge Valve

Opening this valve during operation would result in injection of RWT borated water into the reactor coolant system. This would, in turn, result in overboration with an adverse reaction in reactor power and the potential for a power transient.

V-2505 and V-2524
RCP Control Bleedoff Isolation Valves

Exercising either of these valves to the closed position when any of the reactor coolant pumps (RCP's) are in operation would interrupt flow from the RCP seals and result in damage to the pump(s).

Chemical & Volume Control (2998-G-078 Sh. 122)

SE-02-03 and SE-02-04
Auxiliary Pressurizer Spray Valves

Opening either of these valves (or failure in the open position) during plant operation would cause an RCS pressure transient that could potentially adversely affect plant safety and lead to a plant trip. In addition, the pressurizer spray piping would be subjected to undesirable thermal shock.

V-2431
Auxiliary Pressurizer Spray Check Valve

In order to test this valve, either SE-02-03 or SE-02-04 must be opened. Opening either of these valves (or failure in the open position) during plant operation would cause an RCS pressure transient that could potentially adversely affect plant safety and lead to a plant trip. In addition, the pressurizer spray piping would be subjected to undesirable thermal shock.

V-2440
Charging Pump Discharge Check Valve To Safety Injection

Opening this valve requires operating a charging pump and discharging into the RCS via the safety injection nozzles. Per Technical Specification 3.5.2, thermal cycling of the safety injection nozzles is undesirable and should be avoided.

V-2515 and V-2516
Letdown Line Isolation Valves

Closing these valves during operation isolates the letdown line from the RCS and would result in undesirable pressurizer level transients with the potential for a plant trip. If a valve failed to reopen, then an unexpected plant shutdown would be required.

V-2598
Charging Line Isolation Valve

Closing this valve during operation isolates the charging pumps from the RCS and would result in undesirable pressurizer level transients with the potential for a plant trip and potential damage to the charging pumps. If the valve failed to reopen, then an unexpected plant shutdown would be required.

Safety Injection / Residual Heat Removal (2998-G-078 Sh 130)

V-3106 and V-3107
LPSI Pump Discharge Check Valves

During normal plant operation, the LPSI Pumps cannot develop sufficient discharge pressure to pump through these valves to the RCS and exercise them in the open direction. The only other test flow path available is through the shutdown cooling line recirculating to the RWT. During this test there would be significant backpressure on both LPSI minimum flow discharge lines such that the there may not be adequate cooling to the non-test LPSI Pump should accident response be required. This could result in both LPSI Pumps being effectively inoperable.

[illegible]

[illegible]

Safety Injection / Residual Heat Removal (2998-G-078 Sh 131)

V-3114, V-3124, V-3134, and V-3144
LPSI Cold Leg Injection Check Valves

During normal plant operation, the LPSI Pumps cannot develop sufficient discharge pressure to pump through these valves to the RCS and exercise them in the open direction.

V-3480, 3481, 3651, and 3652
Shutdown Cooling RCS Isolation Valves

These valves are provided with electrical interlocks that prevent opening whenever Reactor Coolant System pressure exceeds 275 psia. This precludes exercising these valves in any other plant condition than cold shutdown.

V-3545, V-3664, and V-3665
Shutdown Cooling Isolation and Cross Connect Valves

The motor-operated valves V-3664 and V-3665 are isolation valves for shutdown cooling and V-3545 is the cross connect valve between the two trains of shutdown cooling. These valves are normally locked closed. A failure of these valves in any other position could jeopardize the integrity of the Low Pressure Safety Injection System.

Safety Injection / Residual Heat Removal (2998-G-078 Sh 132)

SE-03-1A thru 1D
SI Tank Drain Valves

Stroke testing these valves could allow the associated SI Tank to drop below its Technical Specification in tank pressure and/or level. Failure in this mode would render the SI Tank inoperable and require a plant shutdown.

V-3611, V-3621, V-3631, and V-3641
SI Tank Fill Valves

Stroke testing these valves could allow the associated SI Tank to drop below its Technical Specification in tank pressure and/or level. Failure in this mode would render the SI Tank inoperable and require a plant shutdown.

V-3614, V-3624, V-3634, and V-3644
SI Tank Discharge Isolation Valves

Stroke testing these valves in the closed direction during normal operation is not possible. The valves are normally locked open with their breaker opened. Also they are interlocked to open when RCS pressure exceeds 500 psia. Therefore, the valves cannot be cycled except during cold shutdowns when RCS pressure is < 500 psia.

V-3733 thru V-3740
SI Tank Vent Valves

Opening any of these valves during normal plant operation with the SI Tanks pressurized is undesirable since if a valve were to fail to re-close the result would be depressurization of the affected SI Tank and pressurization of the containment building with the potential for safety system actuation.

<u>Main Steam (2998-G-079 Sh 1)</u>

HCV-08-1 A&B
Main Steam Isolation Valves

During plant operation at power, full closure of either of these valves is not practical as it would require isolating a steam generator which would result in a severe transient on the steam and reactor systems and a possible plant trip.

V-8130 and V-8163
Steam-Driven AFW Pump Steam Supply Check Valves

Verifying closure of these valves at normal operating pressures would required isolating the associated steam generator from the steam supply lines and venting the piping between the closed isolation valve and the check valve. It is considered to be imprudent to isolate the steam supply during operation and, in addition, it is undesirable to subject plant personnel to the hazards associated with venting the steam line at these operating conditions. Full stroke operation of these valves requires operating 2C AFW Pump and full accident flow rate which is not practical during plant operation at power. (See Relief Request PR-4)

[illegible]

Feedwater (2998-G-080 Sh 2)

HCV-09-1 A&B and HCV-09-2 A&B
Main Feedwater Isolation Valves

During plant operation at power, closure of any of these valves is not practical as it would require isolating a steam generator which would result in a severe transient on the steam and reactor systems and a plant trip.

V-9107, 9123, and 9139
Auxiliary Feedwater Pump Discharge Check Valves

Full-stroke exercising of these valves would require operation of the related auxiliary feedwater pump and injection of cold water (85 deg-F) into the hot (450 deg-F) feedwater supply piping. This, in turn, would result in unacceptable thermal stress on the feedwater system piping components.

V-9119, 9135, 9151, and 9157
Auxiliary Feedwater Supply Check Valves

Full-stroke exercising of these valves would require operation of a related auxiliary feedwater pump and injection of cold water (85 deg-F) into the hot (450 deg-F) feedwater supply piping. This, in turn, would result in unacceptable thermal stress on the feedwater system piping components.

Component Cooling System (2998-G-083)

HCV-14-1,2,6 & 7
RCP Cooling Water Supply/Return Isolation Valves

These valves are required to be open to ensure continued cooling of reactor coolant pump auxiliary components and the control rod drives. Closing any of these valves during plant operation would result in severe RCP and CRD damage leading to plant operation in a potentially unsafe mode and a subsequent plant shutdown.

HCV-14-3 A&B
Shutdown Heat Exchanger Return Valves

Testing either of these valves during plant operation would result in an unbalanced flow condition in the affected CCW train and decreased flow to essential equipment. This could result in component damage or an undesirable plant transient.

Service Air (2998-G-085, Sh 1)

V-181270
Service Air Containment Isolation Check Valve

During normal power operation, the service air supply to the containment building is isolated. The containment isolation valves, HCV-18-2, is a normally shut valve used to isolate the service air system inside containment. Testing a check valve in an isolated section of a system is not warranted. The check valve will be back flow tested during cold shutdowns when the section of the service air system inside the containment building is in service.

Instrument Air (2998-G-085, Sh 2)

HCV-18-1
Primary Containment Instrument Air Supply

Closing this valve isolates operating air to critical components in the containment building including the pressurizer spray valves and CVCS letdown isolation valves and could cause severe plant transients and a plant trip. Failure in the closed position would cause a plant shutdown.

V-18279 and V-18283
Maintenance Hatch Door Seal Accumulator Air Supply

Performing the closed test on these valves requires entry into the Shield Building and isolating the air supply to the vacuum relief valves. During operation this is a neutron radiation area. Due to ALARA considerations, these check valves will only be tested during cold shutdowns.

Heating, Air Conditioning, And Ventilation, & Air Conditioning (2998-G-878)

FCV-25-1 thru FCV-25-6
Primary Containment Purge and Vent Valves

These valves are required to remain closed at all times when the plant is operating in Modes 1 through 4, thus they are not required to operate (close) during operational periods. Due to the large size of these valves and the potential for damage as a result of frequent cycling, it is not prudent to operate them more than is absolutely necessary.

V-25-20 and V-25-21
Containment Vacuum Breakers

These valves can only be exercised manually requiring direct access to each valve. Since these valves are located within the containment building, access is limited and not routinely practical.

REACTOR CONTAINMENT BUILDING INTEGRATED LEAKAGE RATE TEST

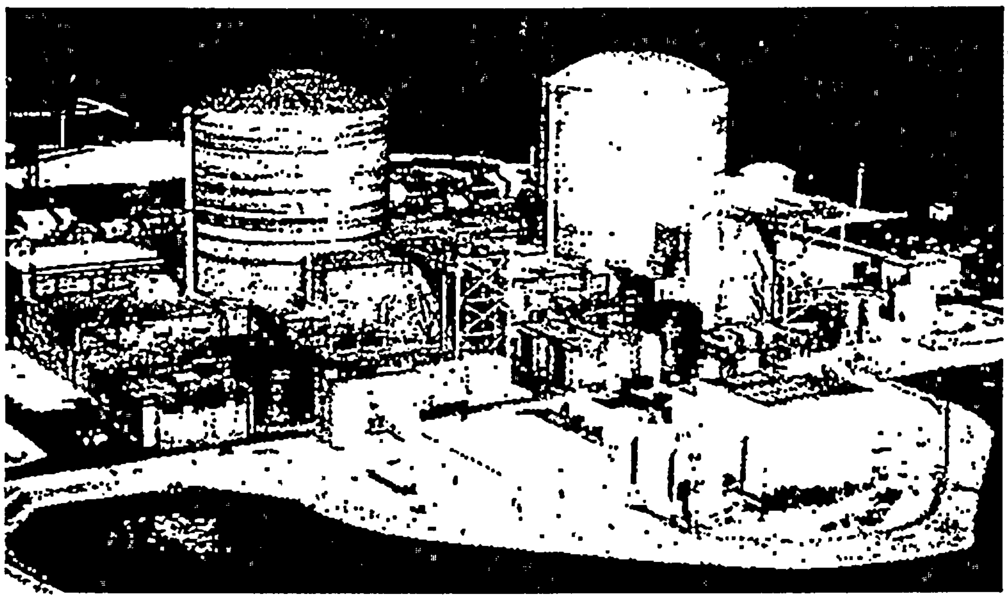
FINAL REPORT

ST. LUCIE UNIT NO. 2

NUCLEAR POWER PLANT

FT. PIERCE, FL.

DOCKET NUMBER 50-389



ST. LUCIE PLANT UNIT NO. 2
NUCLEAR POWER PLANT
FT. PIERCE, FLORIDA

DOCKET NO. 50-389

REACTOR CONTAINMENT BUILDING INTEGRATED LEAKAGE RATE TEST

Prepared By:

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Jim Connor Test & Code Lead Engineer

Approved by:

D. H. West Technical Supervisor

Date of Test Completion:
June 17, 1992

I. INTRODUCTION AND SUMMARY

A periodic Type "A" Integrated Leakage Rate Test (ILRT) was successfully conducted on the primary containment structure of the Florida Power & Light Company St. Lucie Plant Unit No. 2 Pressurized Water Reactor. This test was performed at full pressure in accordance with the facility Technical Specifications. This ILRT test was performed using the "Absolute Method" of testing in accordance with the Code of Federal Regulations, Title 10, Part 50 Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," in accordance with ANSI N45.4 - 1972, American National Standard, "Leakage Rate Testing of Containment Structures for Nuclear Reactors," and the methodology and calculational requirement of Topical Report BN-TOP-1, Revision 1, "Testing Criteria for Integrated Leakage Rate Testing of Primary Containment Structures for Nuclear Power Plants." The ILRT was performed at a pressure in excess of the calculated peak containment internal pressure related to the design basis accident as specified in the Final Safety Analysis Report (FSAR) and the Technical Specifications. This report describes and presents the results of the periodic Type "A" leakage rate testing, including the supplemental test method utilized for verification. In addition, Florida Power & Light Company performs types "B" and "C" testing in accordance with the requirements of 10CFR50, Appendix J, and the Technical Specifications. The results of types "B" and "C" testing performed since the last ILRT are provided in this report.

The resulting reported "as-found" Type "A" containment leakage at 42.3 psig is 0.052 percent of the contained mass per day. This value includes the difference between the as-found and as-left minimum pathway Types "B" and "C" local leakage measurements as required by the NRC I&E Information Notice 85-71. The resulting reported "as-left" Type "A" containment leakage at 42.3 psig is 0.052 percent of the contained mass per day. The acceptance criteria for this test as contained in the facility Technical Specifications is that leakage cannot exceed 0.375 percent of the contained air mass per day for either the "as-found" or "as-left" case.

II. TEST DISCUSSION

A. Description of the Containment

The containment vessel completely encloses the entire reactor and reactor coolant system to ensure no leakage of radioactive materials to the environment in the unlikely event of a loss of coolant accident.

The containment system design incorporates a free-standing containment vessel surrounded by a low-leakage concrete shield building. A four-foot annular space is provided between the outer wall of the containment vessel and the inner wall of the shield building to allow filtration of containment vessel leakage during

accident conditions to minimize off-site doses.

The free-standing containment vessel is a two-inch thick right circular cylinder with a one-inch thick hemispherical dome and two-inch thick ellipsoidal bottom. The overall vessel dimensions are 140-foot diameter by 232-foot high. The vessel wall thickness is increased to a minimum of four inches adjacent to all penetrations and openings. The vessel is fabricated of ASME-SA 516 Grade 70 fully kilned pressure vessel quality steel plate. The net free volume of the containment vessel is 2.5×10^6 cubic feet.

The containment vessel structure includes one personnel airlock, one emergency escape lock, one fuel transfer tube, one equipment maintenance hatch and one seal-welded construction hatch. All process piping and electrical penetrations are welded directly to the containment vessel nozzles with the exception of the main steam, main feedwater, and fuel transfer tube penetrations. These penetrations are provided with testable multiple ply expansion bellows to allow for thermal growth or building differential motion.

The containment vessel is designed and constructed in accordance with the requirements for Class MC vessels contained in Section III of the ASME Code. The containment vessel is code stamped for a design internal containment pressure of 44 psig at a temperature of 264 °F. The containment vessel and all penetrations

are designed to limit leakage to less than 0.5 percent by weight of the contained air per day at the above design conditions. The calculated peak accident pressure for the design basis accident for the St. Lucie Plant No. 2 is 41.8 psig, in accordance with Technical Specification 3.6.1.2.a.1 .

B. Description of ILRT Instrumentation

The containment system was equipped with instrumentation to permit leakage rate determination by the "absolute method." Utilizing this method, the actual mass of dry air within the containment is calculated. The leakage rate becomes the time rate of change of this value. The mass of air (Q) is calculated according to the Perfect Gas Law as follows:

$$Q=\frac{(P-P_V)*V}{R*T}$$

where:
- P - Containment Total Absolute Pressure
- Pv - Containment Water Vapor Pressure (Average)
- V - Containment Net Free Volume
- R - Gas Constant
- T - Containment Absolute Temperature (Average)

The primary measurement variables required are containment absolute pressure, containment relative humidity, and containment temperature as a function of time. During the supplementary verification test, containment bleed-off flow is also recorded.

Average containment absolute temperature is determined by measuring discrete local temperatures throughout the containment and applying a mass and volume weighted averaging technique. The volume fraction for each sensor is determined based upon solid geometrical calculations:

$$\frac{1}{T}=\sum\frac{Vf_i}{T_i}$$

where: T - Containment Absolute Temperature (Average)
T_i - Local Temperature for Sensor i
Vf_i - Volume Fraction for Sensor i

Average containment water vapor pressure is determined by measuring discrete local relative humidities throughout the containment, converting these to local vapor pressures using local group temperatures and applying a mass and volume weighted averaging technique. The volume fractions for the relative humidity sensors are determined in the same manner as for the temperature sensors above.

$$Pv_j=\%RH_j*Psat\ for\ T_j$$

$$Pv=T\sum\frac{(Pv_j*Vf_j)}{T_j}$$

where: $\%RH_j$ - Relative Humidity for Sensor j

Psat for T_j - Steam Table Saturation Pressure for local group average temperature near sensor j

Pv_j - Calculated local vapor pressure for sensor j

Pv - Containment Water vapor pressure (Average)

T - Containment Absolute Temperature (Average)

VF_j - Volume Fraction for sensor j

T_j - Local temperature for sensor j

The Instrument Selection Guide or ISG is used to determine the ability of the instrumentation system to measure the leakage rate. The calculated ISG for this test met all acceptance criteria for all test instrumentation systems.

1. Temperature Instrumentation

Forty precision Resistance Temperature Detectors (RTDs) were located throughout the containment to allow measurement of the weighted average air temperature. The location of the temperature detectors in the containment is depicted in Figure A. Each RTD sensor was supplied with a calibrated resistance versus temperature curve accurate to $\pm 0.5\,^{\circ}F$. The sensitivity and repeatability of each RTD sensor is less than $\pm 0.01\,^{\circ}F$.

The signal conditioning circuit and readout for the RTD

sensors was a Fluke 2280B data logger operating in a constant current mode. The operating parameters for the RTD constant current card are accurate to ±0.16 °F and has a resolution of ±0.01 °F.

Each RTD was in situ calibration checked after installation to verify correct operation. The data logger operating as a total loop with an RTD in the circuit has a repeatability of ±0.01 °F and a resolution of ±0.01 °F.

2. Humidity Instrumentation

Ten Resistance Humidity Detectors (RHDs) were located throughout the containment to allow measurement of the weighted average containment vapor pressure. The location of the RHDs in the containment is depicted in Figure B. The calibrated accuracy of the RHDs is ±2.5 percent RH, the repeatability of the RHDs is ±0.01 percent RH, and the sensitivity of the RHDs is ±0.1 percent RH.

The readout device used for the RHDs was a Fluke 2280B data logger. The repeatability of this device is ±0.01 percent RH while the resolution of the device is ±0.01 percent RH.

Each RHD was in situ calibration checked after installation to verify correct operation.

3. Pressure Instrumentation

Two precision vibrating cylinder element pressure sensors were used to determine containment absolute pressure. The arrangement of tubing connections between the pressure sensors and the containment is shown in Figure C. Either pressure sensor could be used as the primary pressure sensor for leakage rate calculations with the remaining sensor being considered as a backup. The calibrated accuracy of the manometers is ±0.015 percent of reading. The sensitivity, repeatability, and resolution of the pressure sensors is ±0.002 psi. Binary Coded Decimal (BCD) output from both pressure sensors was connected to the Fluke 2280B data logger.

4. Flow Instrumentation

A variable area float-type rotameter was used to superimpose leakage during the supplementary CLRT. The piping connection between the rotameter and the containment is shown in Figure C. The accuracy, repeatability, and sensitivity for the rotameter in units of SCFM and converted to equivalent leakage values is given below:

	SCFM	Equivalent Leakage
Peak Pressure Rotameter Accuracy	±0.20	±0.0031 %/day
Repeatability	±0.05	±0.0008 %/day
Sensitivity	±0.05	±0.0008 %/day

5. Instrument Selection Guide (ISG) Calculation

The Instrument Selection Guide is a method of compiling the instrumentation sensitivity and resolution for each process measurement variable used during the ILRT and evaluating the total instrumentation system's ability to detect leakage rates in the range required. The ISG formula is described in American National Standard ANSI/ANS 56.8-1987. Although the ISG is a very conservative measure of sensitivity, the general industry practice for this test has been to require sensitivity at least four times better than the containment allowable leakage or ISG ≤ 0.25La.

The calculated ISG for the instrumentation used for this test was 0.0078 percent per day, for an 8 hour test. The allowable value for this test is 0.25La or 0.125 percent per day, for an 8 hour test. The ISG calculation met all recommended criteria and demonstrated the ability of the ILRT instrumentation system to measure containment leakage with a sensitivity exceeding that required by the appropriate industry standards.

C. Containment Pressurization Equipment

The equipment used to pressurize the containment is shown in Figure D. The nine oil-free industrial diesel-driven air compressors had a total nominal capacity of 13,200 SCFM. The compressed air was then routed to water-cooled aftercoolers,

moisture separators, and refrigerant air dryers. This equipment assured that clean and dry air was used to pressurize the containment.

D. Description of the Computer Program

The Ebasco ILRT computer program is an interactive program written specifically for fast, easy utilization during all phases of the ILRT and CLRT. The program is written in a high-level, compiled, structured language and is operated on portable MS-DOS personal computer. The program has been verified and meets all requirements of the Ebasco and Florida Power & Light Quality Assurance Programs.

As necessary, data entry and modifications are readily accomplished by the data acquisition team. In addition to extensive data verification routines, the program calculates, on demand, total time and mass point leak rates as well as the 95 percent Upper Confidence Level for these leakage rate calculations. Calculations and methodology of the program are derived from American National Standard ANSI N45.4-1972, ANSI/ANS 56.8-1987 and Topical Report BN-TOP-1, Revision 1.

Input data may be deleted for a given instrument in the case of a sensor malfunction. The deletion of a given instrument is performed on all samples in the data base. Weighting factors, if applicable, are then recalculated for the remaining instrument

sensors of that type (see section III.A).

Data evaluations are enhanced by the flexible display of either sensor variables or various computed values in tabular or graphical form on the computer screen or printer. Data is recorded on magnetic media to prevent loss during the testing. All data is stored on the computer system in use, with retrieval capability to any desired data base throughout the testing.

Ancillary portions of the program assist the user in determination of temperature stabilization, determining the ILRT termination criteria, performing ISG calculations, performing in situ instrument loop performance calculations and determination of acceptable superimposed CLRT leakage verification.

Temperature, pressure and humidity data are transmitted from the ILRT instrumentation system to the computer via an RS-232 link at 20 minute intervals. Computer verification and checking routines supplement data verification by the data acquisition team. Modifications are promptly made when errors are detected.

E. Description of the Testing Sequence

Preparations to pressurize the containment for the conduct of the ILRT included internal and external inspections of the containment structure; installation and check out of the ILRT instrumentation; Types "B" and "C" Local Leakage Rate Tests; alignment of valves and breakers for test conditions; and the installation and check out of the temporary pressurization facilities. These preparations were completed on June 15, 1992.

All ILRT instrumentation was declared operable with performance within manufacturers' tolerances, with the exception of TE-20 and TE-38. These were deleted from computer calculations and the volume fractions adjusted accordingly. Pressure sensor No. 1 was selected to be the primary pressure instrument, as it had exhibited better repeatability and stability during the in situ testing.

Three penetrations were required to be in service during the ILRT and were not lined up to simulate accident conditions; P-7 (Primary Makeup Water), P-52D (ILRT Pressure Sensing Line), and P-52E (ILRT Controlled Bleed off Line).

Primary water to the containment is required for fire protection, and the two ILRT penetrations are used to conduct the test. The minimum pathway leakage for these penetrations, determined during Type "C" local testing, is added to the measured ILRT leakage to account for these penetrations being in service during the test. (P-54 ILRT pressurization line is normally isolated with a blank flange and one valve. During the Test the only isolation is the valve outside containment is shut. As a conservative measure the leakage for this penetration is also used in Appendix A for calculation of the "as-left" condition.)

Pressurization of the containment started at 10:10 hours on June 15,1992. Figure E pictorially depicts the sequence of testing at pressure. The pressurization rate was maintained at 4.4 psi/hr, and a target pressure of 58.48 psia was achieved at 20:00 hours on 6/15/92. This target pressure was 1.98 psi above the minimum test pressure to account for the expected pressure decrease due to temperature stabilization and to allow for some leakage margin during the test sequence. Data acquisition and analysis during the temperature stabilization phase began at 20:00 hours at 20 minute intervals.

During pressurization, Leak Survey Teams found no indication of any significant leakage on any of the leak chase points .

The containment temperature stabilization criteria was met at 00:00 hours on June 16,1992, after acquisition of four hours of data. During this period, the temperature and pressure decreases followed predictable trends. Because of high relative humidity readings, and indications of instability in the vapor pressure calculations stabilization was conservatively continued until 15:20 on 6/16/92. For more detailed discussion see Analysis and Interpretation Section.

The 8.67 hour period of leakage measurements started at 15:20 hours on June 16,1992, and was successfully terminated at 00:00

hours on June 17,1992, with acceptable leakage values determined. The data accumulated displayed the following leakage rates:

Simple BN-TOP-1 Leakage Rate	= -0.0232 %/day
Fitted BN-TOP-1 Leakage Rate	= -0.0104 %/day
95% Upper Confidence Level (UCL)	= 0.0516 %/day

The leakage plot had a negative skew after 8 hours. The acceptance criteria for this test is 0.75 La or 0.375 %/day.

To verify the results of the ILRT, a verification Controlled Leakage Rate Test (CLRT) was conducted. Using the variable area full-pressure rotameter, a superimposed flow of 17.79 SCFM was added to the leakage already present in the containment. This superimposed flow is equivalent to leakage of 0.264 percent per day. A one-hour stabilization period was allowed to lapse after addition of this leakage in accordance with the requirements of Topical Report BN-TOP-1. Data accumulation for the CLRT was started at 01:00 hours on June 17,1992 and the CLRT was conducted for a 4.4 hour period. The measured CLRT leakage rates for this period were:

Simple BN-TOP-1 Leakage Rate	= 0.2524 %/day
Fitted BN-TOP-1 Leakage Rate	= 0.2529 %/day
Target CLRT Leakage Rate	= 0.253 %/day

The target CLRT leakage for this test was 0.253 ±0.125 percent per day, or within the criteria as measured. As shown in figure Q the calculated air mass and fitted leakage rate quickly changed when the controlled leak rate was introduced. The ILRT and CLRT were declared successful at 05:30 hours on June 17,1992.

At 05:31 hours on June 17,1992, depressurization of the containment was initiated at a rate of 6 psi/hr. Containment entry for post-test inspection purposes occurred when the containment pressure was approximately 1.6 psig at 14:00 hours on June 17,1992. The post-test inspection detected no anomalies or damage other than several broken lighting fixture covers. Particular attention was paid for evidence of any leakage that may have contributed to high humidity levels, none was found.

Corrections were made to the measured ILRT leakage to account for the three penetrations which were in service during the ILRT and to account for the difference between the as-found and as-left minimum pathway local leakage values as required by NRC I&E Information Notice 85-71.

95% Upper Confidence Level (UCL) during ILRT	= 5.16×10^{-2} %/day
Corrections for Local Leakage Measurements	= $\underline{8.5 \times 10^{-4}}$ %/day
Total Reported Containment UCL	= 5.25×10^{-2} %/day

This value satisfies the acceptance criteria for the test of being less than 0.375 percent per day.

III. ANALYSIS AND INTERPRETATION

A. Instrumentation System Performance

All of the 38 temperature detectors inservice at the start of the test performed as expected with no anomalous behavior detected by the Ebasco ILRT computer program error checking routines during the conduct of the test. This computer program also determines the in-situ temperature loop repeatability which consists of **process measurement variations as well as sensor noise.** The average in situ loop repeatability for the 38 operating temperature sensors was 0.0104 °F. This performance compares well with the vendor-claimed temperature sensor loop repeatability, excluding process variations, as given in Section II.B.1. However several RTD's showed a significantly higher calculated repeatability than the group as a whole. A detailed review of the data gathered reveals that between test samples 85 and 100 there were some oscillations in RHD-6, RHD-7 and TE-13, TE-21, TE-22, TE-27. These deviations are believed to indicate a density turnover and are not believed to indicate any sensor failure. However this data also shows the sensitivity of leakage calculations when small leakage rates are being measured. This does not necessarily indicate a sensor malfunction, but may indicate local variations in process as well, see figure P.

Ten relative humidity sensors were installed in the

containment for the ILRT. All ten channels for humidity operated as expected with no anomalous behavior detected by the ILRT computer program error checking routines, except as noted above. The average in situ loop repeatability for the relative humidity sensors was 0.07 percent RH. At the start of the stabilization period group average humidity ranged from 44% at the lowest elevation to 64% at the upper elevation. Because of the high humidity levels experienced during the test the humidity group at the top elevation reached saturation levels as the containment atmospheric temperatures equalized with the structure temperatures. Also because of the stratification of humidity by elevation; mixing and stabilization were slow to occur. Sensor response was monitored during the test phase and depressurization phase. All sensor trends followed group trends and expected response based on pressure and temperature changes.

Two pressure sensors were installed for the ILRT, with one utilized for testing and one considered as a spare. Prior to containment pressurization, computer analysis demonstrated that pressure sensor 1 was more stable over an eight-hour period than the other sensor. During the ILRT, the in-situ pressure loop repeatability for both sensors was 0.0002 psi. This performance compares well with the vendor-claimed pressure sensor loop repeatability, excluding process variations, given in Section II.B.3.

The variable area rotameter performed as expected with no

evidence of unstable reading, float sticking, or moisture in the float tube.

In summary, all of the ILRT test instrumentation performed in an adequate manner to allow determination of containment leakage rates to the sensitivity required, as verified by the controlled leakage rate test.

B. Temperature Stabilization Phase

Prior to pressurization of the containment, the atmospheric conditions were very unstable. In-situ humidity checks varied from 59% to 75%, depending on the day they were performed. For several days prior to the ILRT the site had experienced severe afternoon thunder storms with high temperatures in the 90's. Prior to pressurization the containment was purged with two of the pressurization compressors and dryers for several hours in an attempt to reduce average humidity levels. Average humidity was reduced from approximately 75% to 60% . During pressurization, the cool and dry air introduced at the bottom of containment acts as a "piston" and compresses and heats the air at the top of containment. At the end of pressurization, the average temperature was 102.9 °F with a maximum spread of temperature from the highest reading sensor to lowest reading sensor of 24.4 °F.

The results of the temperature stabilization phase are presented in Appendix B.1. The acceptance criteria given in Topical Report

BN-TOP-1, Revision 1, are described in Note 2 in that appendix. However as seen in figures F, G, and H vapor pressure did not stabilize as quickly as temperature. This shows that modeling the containment with a discrete number of sensors can overstate the effects of the vapor pressure correction to the Ideal Gas Law, during periods of high unstable humidity. The data presented shows that a smooth and predictable temperature stabilization occurred. At the end of stabilization, the average temperature was 91.1 °F with a maximum spread of temperature from the highest reading sensor to the lowest reading sensor of 7.4 °F. This demonstrates that the heat sinks of concrete and steel in the containment were returning the containment atmosphere to a stable temperature condition.

C. Leakage Survey Phase

Leakage survey teams found no indications of any significant leaks during the test at any of the leak chase detection points. Since the total type B & C minimum path leakage was 1.17 SCFM ($1.75X10^{-2}$ %/day) this result was not unexpected. Leakage rate measurements on the containment were started after the temperature stabilization phase using the total time leakage rate methods of Topical Report BN-TOP-1, Revision 1. As an additional diagnostic tool, mass point leakage rate measurements, as described in ANSI/ANS 56.8-1987, were conducted in parallel. The mass point leakage calculations are not sensitive to the starting point of the

test and will detect changes in containment leakage more rapidly than the total time method.

D. Integrated Leakage Rate Phase

Leakage measurements were started at 15:20 hours on June 16, 1992. The total time BN-TOP-1 results for 8.67 hours of leakage measurements are presented in Appendix B.3. A summary of the measured leakage after eight hours is:

	BN-TOP-1 Total Time
Simple Leakage Rate	-0.0232 %/day
Fitted Leakage Rate	-0.0104 %/day
Upper Confidence Level	0.0516 %/day
Type B&C Minimum Path	0.0175 %/day

The higher Upper Confidence Level of the BN-TOP-1 measurements is due to the nature of performing regression analysis on simple leakage rates instead of regression analysis on masses and the more conservative statistics utilized by BN-TOP-1.

A conservative calculation of the minimum path leakage based on the Type "B" & "C" test program is 0.0175 %wt/day. This small value combined with the instabilities described in section III.B help explain the very small calculated leakage rates. If the temperature sensor with the largest sample to sample deviation is deleted the new calculated leakage rates are: fitted leakage rate 0.0193, and UCL of 0.0810.

As all acceptance criteria for a Reduced Duration BN-TOP-1 ILRT were met after 8.67 hours as presented in Appendix B.2, the ILRT was declared acceptable. Appendix A presents the corrections to the measured ILRT leakage rates for local leakage rate measurements for both the "as-found" and "as-left" cases.

E. Verification Controlled Leakage Rate Phase

Subsequent to the acceptance of the ILRT results, a superimposed leakage equivalent to 0.264 percent per day was added to the existing containment leakage using the variable area rotameter. A one-hour stabilization period was allowed to lapse after addition of this leakage in accordance with the requirements of Topical Report BN-TOP-1.

Leakage measurements were initiated to verify the results of the ILRT. The minimum duration for the Controlled Leakage Rate Phase was determined to be 4.33 hours in accordance with Topical Report BN-TOP-1. As presented in Appendix B.3, the leakage measurements met the acceptance criteria for the verification phase.

	BN-TOP-1 Total Time
Simple Leakage Rate	0.252 %/day
Fitted Leakage Rate	0.253 %/day

SECTION IV FIGURES

RTD LOCATIONS AND VOLUMES

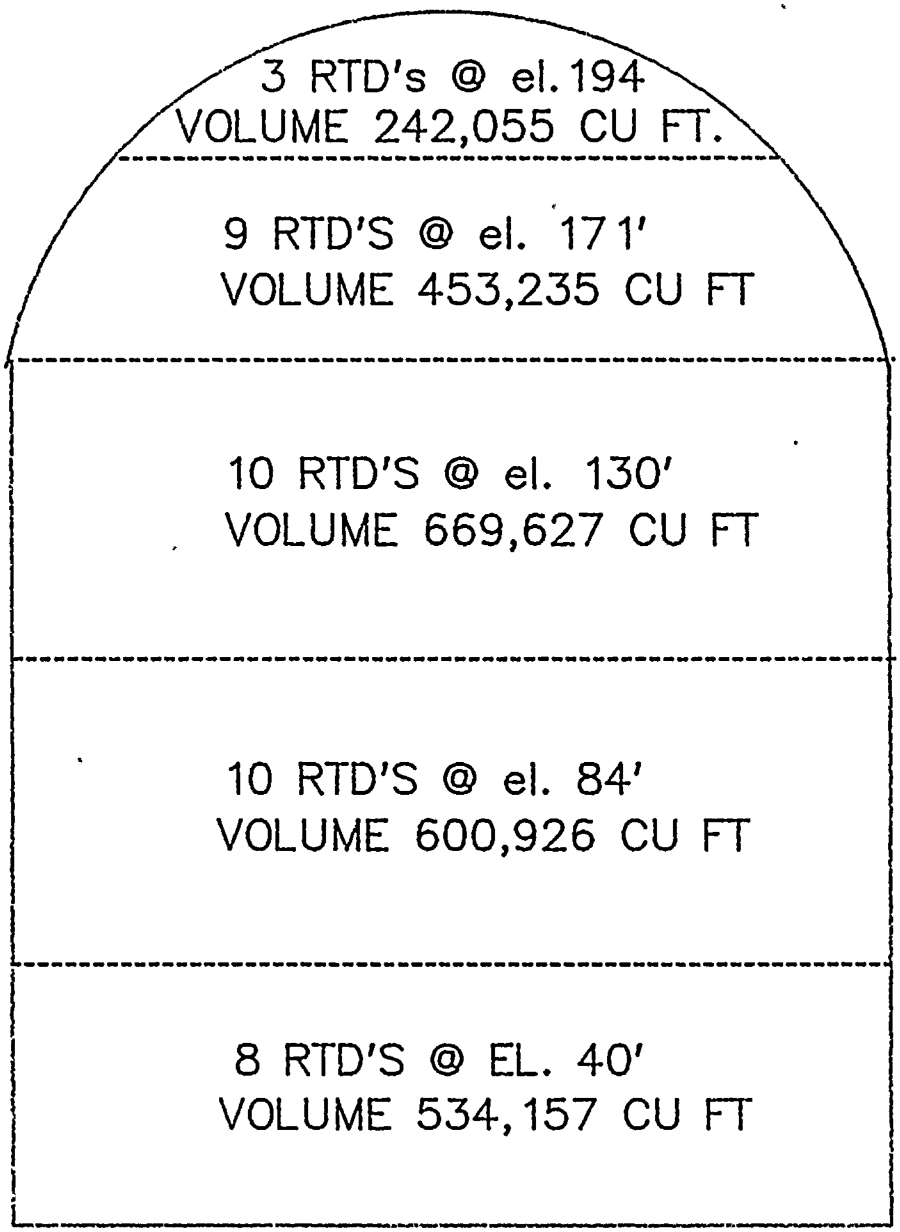

Figure A

RHD LOCATIONS AND VOLUMES

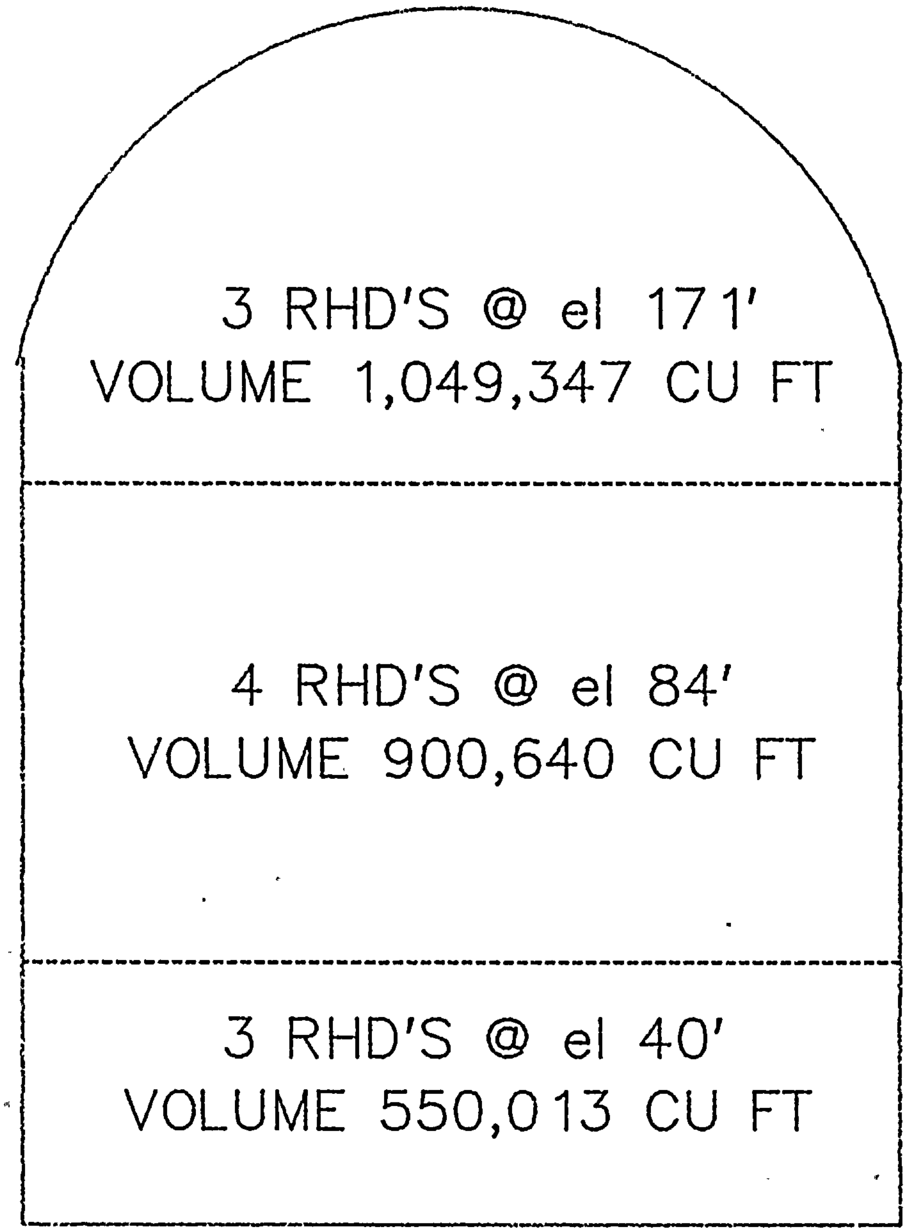

Figure B

FLOW DIAGRAM
ILRT PRESSURE SENSING & CONTROLLED LEAKAGE INSTRUMENTS

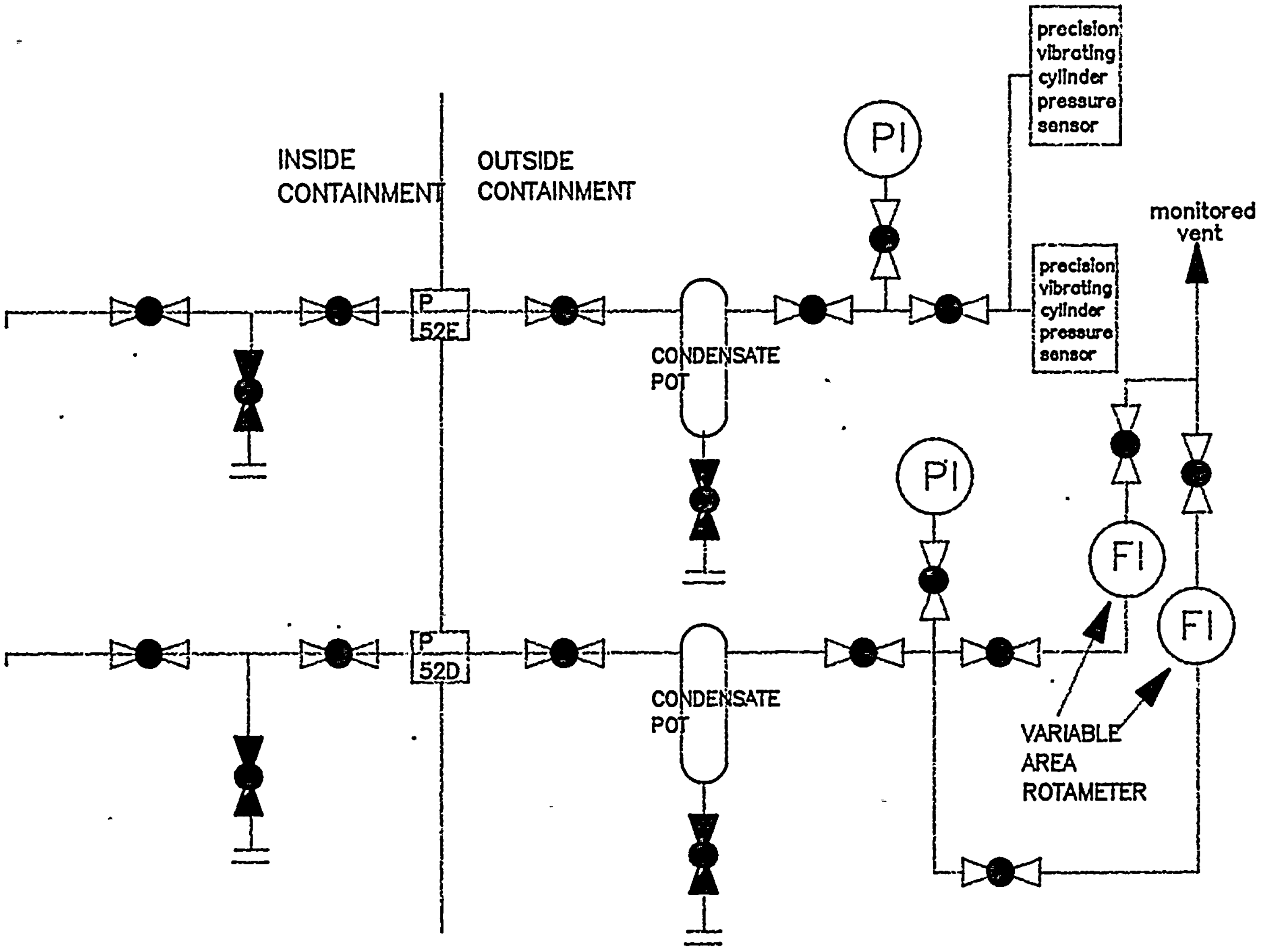

Figure C

ILRT INSTRUMENTATION DIAGRAM

DATA COLLECTION, OUTPUT, AND STORAGE

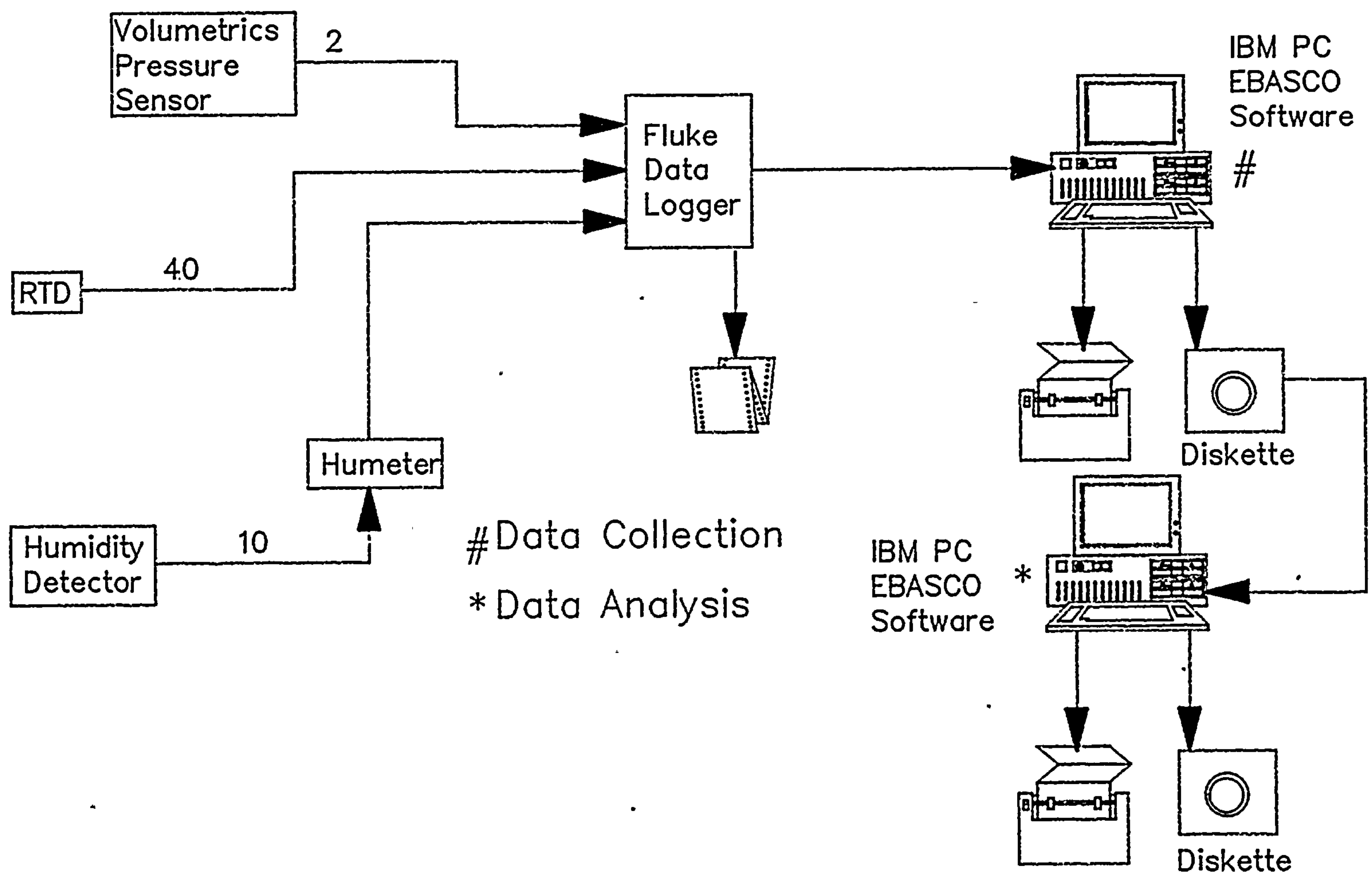

Figure D

ILRT PRESSURIZATION & DEPRESSURIZING SYSTEM

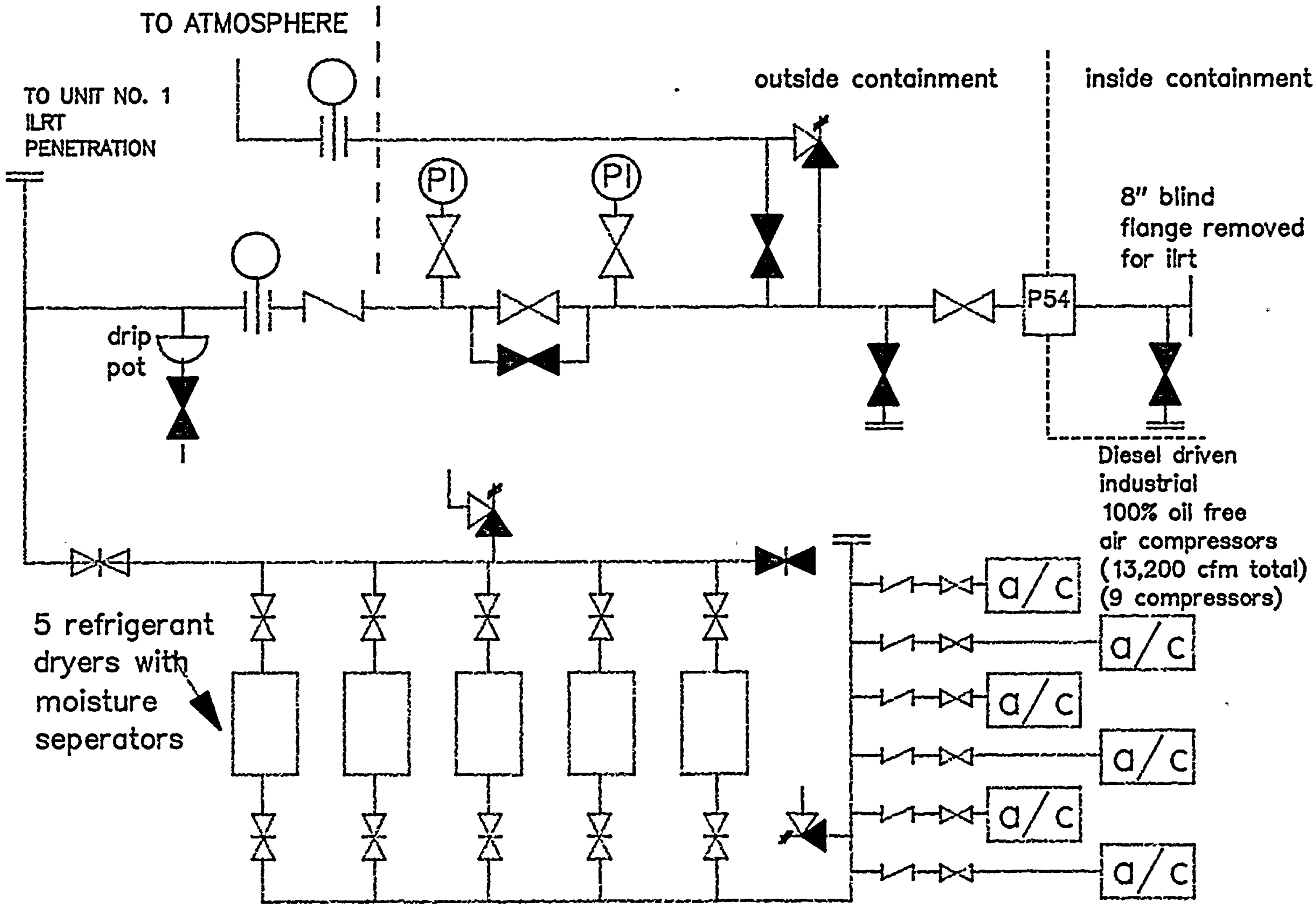

Figure E

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St. Lucie Unit 2 ILRT Sequence

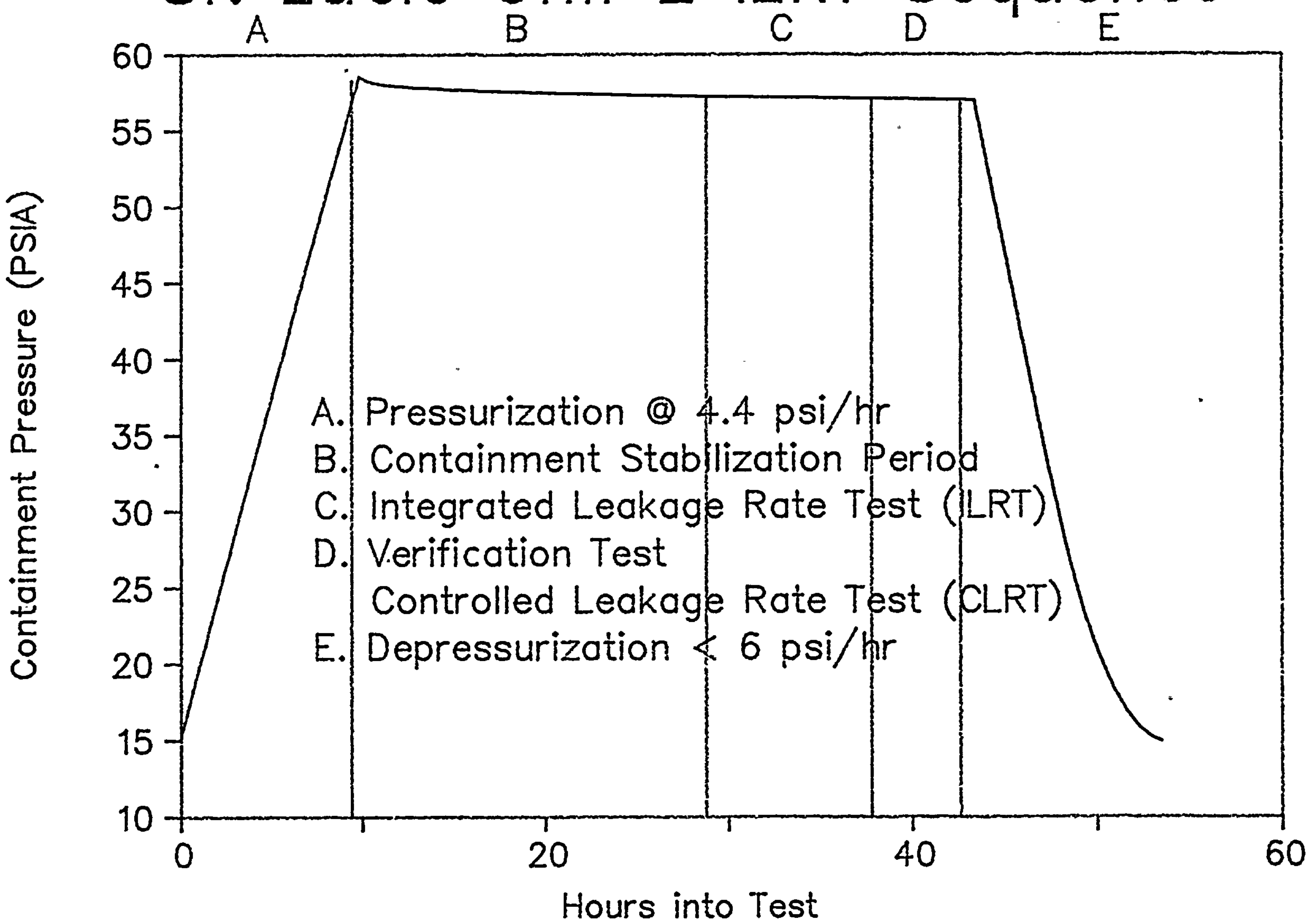


Figure F

SECTION V APPENDICES

APPENDIX A

TABULATION OF

"AS-FOUND AND "AS-LEFT"

ILRT RESULTS

APPENDIX A: TABULATION OF "AS-FOUND" AND "AS-LEFT" ILRT RESULTS

A Correction of ILRT Result for "AS -FOUND" Case

In accordance with NRC I&E Information Notice 85-71, additions are required to the ILRT results due to repairs and/or adjustments made due to Local Leakage rate testing during an outage in which an ILRT is conducted. The corrections include only repairs or adjustments made to containment leakage boundaries which were made prior to the ILRT. These corrections are the difference between the pre-repair and post-repair leakages calculated in the minimum pathway case and corrected for uncertainties in the measurements. During the 1992 refueling outage, three such corrections are necessary.

Penetration	Total Minimum Pathway Repair	Uncertainty	ILRT Total
P-28A SIT Sample	40 sccm	1.79	41.79
P-50 Spare	55 sccm	1.79	56.79
Personnel Airlock	20,000 sccm	347	20,347

The total local minimum pathway leakage plus uncertainty must be added for the penetrations which are in use during the ILRT and whose containment isolation valves are not tested during the ILRT:

Penetration	Total Minimum Pathway Leakage	Uncertainty	ILRT Total
P-52D ILRT Test	100 sccm	1.79	101.79
P-52E ILRT Test	80 sccm	1.79	81.79
P-7 Primary Water	400 sccm	12.8	412.8
P-54 ILRT Test	900 sccm	109	1009

The total "as-found" correction can be found adding the above ILRT to both corrections.

Correction of ILRT results for "as-found" case		22,051 sccm
	or	1.167×10^{-4} %/day
Measured ILRT leakage at a 95% UCL	+	$\underline{5.16 \times 10^{-2}}$ %/day
Reported "as-found" ILRT results		5.172×10^{-2} %/day
Acceptance Criteria (75% La)		0.375 %/day

B. Correction of ILRT Results for "AS-LEFT" Case

The only correction for the "as-left" ILRT case involves the penetrations which were in use during the test, P-52D, P52E, P-54, and P-7. From the above section, the ILRT "as-left" correction can be determined. (Note: A conservative simplification was made by not performing a root-mean-square summation of the local uncertainties.)

Correction of ILRT results for "as-left" case		1605.4 sccm
	or	8.49^{-4} %/day
Measured ILRT Leakage at a 95 % UCL	+	$\underline{5.16 \times 10^{-2}}$ %/day
Reported "as-left" ILRT results		5.25×10^{-2} %/day
Acceptance Criteria (75% La)		0.375 %/day

Appendix B: ILRT Raw Data and Graphical Interpretations

Stabilization Data

Sample Number	TEST TIME	RTD 1 DEG F	RTD 2 DEG F	RTD 3 DEG F	RTD 4 DEG F
31	9.817	89.344	91.791	88.971	88.296
32	10.15	88.093	89.792	87.741	87.239
33	10.483	87.891	89.108	87.494	87.013
34	10.817	87.750	88.830	87.409	86.896
35	11.150	87.653	88.647	87.378	86.831
36	11.483	87.557	88.540	87.324	86.777
37	11.817	87.483	88.423	87.270	86.724
38	12.150	87.429	88.338	87.217	86.692
39	12.483	87.387	88.262	87.185	86.639
40	12.817	87.344	88.209	87.143	86.596
41	13.150	87.310	88.155	87.098	86.565
42	13.483	87.290	88.101	87.067	86.520
43	13.817	87.257	88.070	87.044	86.500
44	14.150	87.232	88.034	87.019	86.484
45	14.483	87.203	87.994	86.993	86.446
46	14.817	87.178	87.958	86.966	86.430
47	15.150	87.149	87.943	86.939	86.403
48	15.483	87.140	87.889	86.928	86.381
49	15.817	87.106	87.867	86.894	86.361
50	16.150	87.095	87.835	86.885	86.350
51	16.483	87.075	87.813	86.874	86.327
52	16.817	87.053	87.793	86.863	86.318
53	17.150	87.039	87.797	86.849	86.314
54	17.483	87.032	87.770	86.820	86.285
55	17.817	87.010	87.748	86.798	86.274
56	18.150	86.979	87.717	86.798	86.265
57	18.483	86.990	87.706	86.778	86.253
58	18.817	86.967	87.685	86.778	86.253
59	19.150	86.967	87.685	86.766	86.231
60	19.483	86.967	87.652	86.755	86.220
61	19.817	86.956	87.643	86.746	86.211
62	20.150	86.947	87.621	86.735	86.200
63	20.483	86.947	87.621	86.724	86.200
64	20.817	86.925	87.609	86.724	86.188
65	21.150	86.925	87.589	86.713	86.168
66	21.483	86.893	87.578	86.701	86.157
67	21.817	86.893	87.567	86.692	86.157
68	22.150	86.893	87.556	86.681	86.157
69	22.483	86.871	87.547	86.681	86.146
70	22.817	86.878	87.531	86.677	86.141
71	23.150	86.860	87.524	86.648	86.135
72	23.483	86.849	87.524	86.659	86.124
73	23.817	86.828	87.502	86.648	86.115
74	24.150	86.866	87.489	86.645	86.110
75	24.483	86.840	87.482	86.627	86.103
76	24.817	86.828	87.460	86.627	86.092
77	25.150	86.828	87.471	86.639	86.092
78	25.483	86.828	87.448	86.616	86.081

Stabilization Data

Sample Number	TEST TIME	RTD 1 DEG F	RTD 2 DEG F	RTD 3 DEG F	RTD 4 DEG F
79	25.817	86.817	87.439	86.616	86.081
80	26.150	86.806	87.428	86.605	86.070
81	26.483	86.806	87.428	86.596	86.070
82	26.817	86.797	87.417	86.596	86.070
83	27.150	86.786	87.406	86.605	86.061
84	27.483	86.801	87.413	86.601	86.068
85	27.817	86.763	87.397	86.585	86.050
86	28.150	86.786	87.386	86.596	86.050
87	28.483	86.752	87.375	86.596	86.050
88	28.817	86.763	87.375	86.596	86.050

Stabilization Data

Sample Number	TEST TIME	RTD 5 DEG F	RTD 6 DEG F	RTD 7 DEG F	RTD 8 DEG F
31	9.817	88.001	88.815	89.150	88.280
32	10.150	87.061	87.991	88.188	87.187
33	10.483	86.825	87.733	87.972	86.985
34	10.817	86.729	87.648	87.856	86.888
35	11.150	86.610	87.583	87.759	86.823
36	11.483	86.536	87.509	87.672	86.769
37	11.817	86.503	87.433	87.587	86.727
38	12.150	86.482	87.370	87.533	86.693
39	12.483	86.440	87.316	87.479	86.650
40	12.817	86.417	87.262	87.425	86.608
41	13.150	86.386	87.219	87.394	86.588
42	13.483	86.364	87.175	87.340	86.543
43	13.817	86.343	87.143	87.308	86.511
44	14.150	86.328	87.118	87.273	86.496
45	14.483	86.290	87.069	87.223	86.469
46	14.817	86.285	87.042	87.185	86.453
47	15.150	86.267	87.004	87.158	86.415
48	15.483	86.236	86.973	87.125	86.404
49	15.817	86.225	86.950	87.104	86.383
50	16.150	86.225	86.928	87.073	86.361
51	16.483	86.202	86.896	87.051	86.350
52	16.817	86.193	86.876	87.028	86.330
53	17.150	86.177	86.860	87.026	86.336
54	17.483	86.160	86.831	86.997	86.307
55	17.817	86.148	86.811	86.974	86.287
56	18.150	86.139	86.789	86.965	86.276
57	18.483	86.128	86.769	86.943	86.265
58	18.817	86.117	86.757	86.932	86.253
59	19.150	86.106	86.735	86.923	86.242
60	19.483	86.097	86.726	86.912	86.222
61	19.817	86.097	86.703	86.889	86.211
62	20.150	86.086	86.692	86.878	86.199
63	20.483	86.074	86.681	86.869	86.191
64	20.817	86.074	86.672	86.858	86.179
65	21.150	86.063	86.661	86.835	86.168
66	21.483	86.052	86.650	86.826	86.168
67	21.817	86.043	86.638	86.815	86.157
68	22.150	86.032	86.627	86.804	86.146
69	22.483	86.043	86.618	86.793	86.137
70	22.817	86.027	86.614	86.788	86.132
71	23.150	86.009	86.607	86.773	86.125
72	23.483	86.020	86.596	86.773	86.114
73	23.817	85.998	86.596	86.761	86.103
74	24.150	85.996	86.582	86.757	86.110
75	24.483	85.989	86.576	86.739	86.094
76	24.817	85.989	86.564	86.728	86.094
77	25.150	85.978	86.553	86.728	86.083
78	25.483	85.967	86.542	86.719	86.072

Stabilization Data

Sample Number	TEST TIME	RTD 5 DEG F	RTD 6 DEG F	RTD 7 DEG F	RTD 8 DEG F
79	25.817	85.978	86.542	86.708	86.072
80	26.150	85.955	86.531	86.696	86.060
81	26.483	85.955	86.531	86.685	86.049
82	26.817	85.947	86.522	86.676	86.049
83	27.150	85.947	86.511	86.676	86.040
84	27.483	85.942	86.517	86.672	86.047
85	27.817	85.935	86.499	86.654	86.040
86	28.150	85.924	86.499	86.654	86.029
87	28.483	85.924	86.488	86.643	86.029
88	28.817	85.924	86.499	86.643	86.018

Stabilization Data

Sample Number	TEST TIME	RTD 9 DEG F	RTD 10 DEG F	RTD 11 DEG F	RTD 12 DEG F
31	9.817	107.34	105.85	107.57	107.52
32	10.150	105.33	103.61	105.41	105.12
33	10.483	103.91	102.35	103.80	103.62
34	10.817	103.09	101.55	102.94	102.78
35	11.150	102.51	100.92	102.40	102.31
36	11.483	102.08	100.49	102.03	101.90
37	11.817	101.70	100.07	101.69	101.53
38	12.150	101.38	99.696	101.44	101.18
39	12.483	101.08	99.318	101.19	100.88
40	12.817	100.89	98.986	100.95	100.59
41	13.150	100.63	98.707	100.73	100.35
42	13.483	100.46	98.448	100.51	100.13
43	13.817	100.31	98.221	100.25	99.867
44	14.150	100.02	98.003	99.980	99.573
45	14.483	99.749	97.781	99.695	99.276
46	14.817	99.520	97.574	99.424	99.036
47	15.150	99.255	97.363	99.149	98.762
48	15.483	99.009	97.170	98.902	98.546
49	15.817	98.796	96.985	98.656	98.319
50	16.150	98.558	96.803	98.409	98.052
51	16.483	98.302	96.630	98.183	97.859
52	16.817	98.107	96.459	97.948	97.632
53	17.150	97.878	96.316	97.742	97.403
54	17.483	97.690	96.147	97.520	97.181
55	17.817	97.486	96.019	97.328	96.976
56	18.150	97.293	95.869	97.135	96.806
57	18.483	97.120	95.729	96.952	96.613
58	18.817	96.950	95.579	96.770	96.440
59	19.150	96.766	95.448	96.598	96.269
60	19.483	96.596	95.309	96.439	96.076
61	19.817	96.446	95.201	96.266	95.934
62	20.150	96.295	95.085	96.105	95.775
63	20.483	96.123	94.954	95.955	95.613
64	20.817	95.984	94.858	95.805	95.463
65	21.150	95.845	94.761	95.667	95.313
66	21.483	95.695	94.653	95.539	95.216
67	21.817	95.576	94.546	95.389	95.054
68	22.150	95.426	94.440	95.250	94.947
69	22.483	95.309	94.332	95.132	94.796
70	22.817	95.208	94.242	95.011	94.664
71	23.150	95.074	94.139	94.885	94.538
72	23.483	94.966	94.009	94.767	94.410
73	23.817	94.847	93.912	94.650	94.302
74	24.150	94.746	93.834	94.539	94.201
75	24.483	94.623	93.719	94.424	94.078
76	24.817	94.527	93.622	94.317	93.959
77	25.150	94.419	93.537	94.212	93.862
78	25.483	94.312	93.429	94.104	93.777

Stabilization Data

Sample Number	TEST TIME	RTD 9 DEG F	RTD 10 DEG F	RTD 11 DEG F	RTD 12 DEG F
79	25.817	94.215	93.333	94.008	93.681
80	26.100	94.119	93.256	93.912	93.551
81	26.483	94.011	93.149	93.816	93.465
82	26.817	93.915	93.075	93.708	93.358
83	27.150	93.830	92.989	93.612	93.272
84	27.483	93.740	92.920	93.532	93.194
85	27.817	93.626	92.828	93.429	93.099
86	28.150	93.539	92.742	93.344	92.994
87	28.483	93.465	92.677	93.270	92.906

Stabilization Data

Sample Number	TEST TIME	RTD 13 DEG F	RTD 14 DEG F	RTD 15 DEG F	RTD 16 DEG F
31	9.817	107.14	107.64	106.96	106.33
32	10.150	104.86	105.32	104.60	104.80
33	10.483	103.37	103.74	103.22	103.33
34	10.817	102.55	102.74	102.24	102.39
35	11.150	101.96	102.16	101.64	101.70
36	11.483	101.52	101.70	101.17	101.21
37	11.817	101.13	101.43	100.80	100.82
38	12.150	100.82	101.16	100.51	100.49
39	12.483	100.56	100.90	100.23	100.19
40	12.817	100.29	100.63	99.947	99.910
41	13.150	100.07	100.35	99.711	99.643
42	13.483	99.905	100.07	99.462	99.407
43	13.817	99.658	99.817	99.238	99.18
44	14.150	99.460	99.565	99.009	98.972
45	14.483	99.283	99.257	98.809	98.752
46	14.817	99.054	98.982	98.623	98.554
47	15.150	98.790	98.719	98.412	98.354
48	15.483	98.532	98.503	98.239	98.170
49	15.817	98.316	98.267	98.046	98.042
50	16.150	98.103	98.029	97.907	97.977
51	16.483	97.857	97.793	97.842	97.903
52	16.817	97.661	97.525	97.661	97.722
53	17.150	97.433	97.305	97.591	97.578
54	17.483	97.244	97.040	97.414	97.410
55	17.817	97.029	96.900	97.264	97.228
56	18.150	96.868	96.696	97.091	97.055
57	18.483	96.675	96.482	96.909	96.873
58	18.817	96.482	96.298	96.748	96.701
59	19.150	96.321	96.138	96.577	96.539
60	19.483	96.139	95.988	96.405	96.380
61	19.817	95.978	95.792	96.254	96.218
62	20.150	95.818	95.632	96.093	96.034
63	20.483	95.668	95.448	95.954	95.906
64	20.817	95.538	95.320	95.792	95.767
65	21.150	95.379	95.138	95.653	95.617
66	21.483	95.238	95.008	95.514	95.478
67	21.817	95.110	94.857	95.375	95.339
68	22.150	94.982	94.729	95.245	95.198
69	22.483	94.841	94.599	95.106	95.070
70	22.817	94.720	94.488	95.005	94.937
71	23.150	94.628	94.309	94.871	94.812
72	23.483	94.521	94.169	94.752	94.704
73	23.817	94.402	93.987	94.635	94.576
74	24.150	94.281	93.886	94.535	94.475
75	24.483	94.155	93.803	94.409	94.361
76	24.817	94.166	93.729	94.301	94.253
77	25.150	94.144	93.601	94.196	94.157

Stabilization Data

Sample Number	TEST TIME	RTD 13 DEG F	RTD 14 DEG F	RTD 15 DEG F	RTD 16 DEG F
78	25.483	94.059	93.502	94.089	94.049
79	25.817	93.940	93.374	93.992	93.944
80	26.150	93.889	93.277	93.884	93.848
81	26.483	93.812	93.158	93.788	93.771
82	26.817	93.705	93.053	93.703	93.686
83	27.150	93.620	92.954	93.604	93.601
84	27.483	93.541	92.833	93.515	93.520
85	27.817	93.458	92.752	93.423	93.428
86	28.150	93.351	92.687	93.338	93.354
87	28.483	93.254	92.601	93.252	93.247
88	28.817	93.192	92.451	93.176	93.159

Stabilization Data

Sample Number	TEST TIME	RTD 17 DEG F	RTD 18 DEG F	RTD 19 DEG F	RTD 20 DEG F
31	9.817	107.85	107.98	101.58	Deleted
32	10.150	105.55	105.65	99.533	Deleted
33	10.483	103.93	104.01	98.492	Deleted
34	10.817	102.90	103.03	98.041	Deleted
35	11.150	102.41	102.44	97.451	Deleted
36	11.483	101.98	102.05	97.108	Deleted
37	11.817	101.57	101.71	96.764	Deleted
38	12.150	101.17	101.43	96.603	Deleted
39	12.483	100.84	101.18	96.410	Deleted
40	12.817	100.58	100.95	96.206	Deleted
41	13.150	100.31	100.74	96.035	Deleted
42	13.483	100.07	100.41	95.885	Deleted
43	13.817	99.865	100.08	95.712	Deleted
44	14.150	99.590	99.815	95.569	Deleted
45	14.483	99.316	99.539	95.412	Deleted
46	14.817	99.096	99.290	95.291	Deleted
47	15.150	98.841	99.014	95.145	Deleted
48	15.483	98.562	98.745	95.026	Deleted
49	15.817	98.304	98.520	94.898	Deleted
50	16.150	98.056	98.296	94.768	Deleted
51	16.483	97.829	98.049	94.661	Deleted
52	16.817	97.519	97.845	94.555	Deleted
53	17.150	97.332	97.648	94.454	Deleted
54	17.483	97.110	97.437	94.340	Deleted
55	17.817	96.874	97.233	94.244	Deleted
56	18.150	96.658	97.051	94.136	Deleted
57	18.483	96.422	96.867	94.028	Deleted
58	18.817	96.066	96.686	93.943	Deleted
59	19.150	95.904	96.513	93.847	Deleted
60	19.483	95.734	96.331	93.750	Deleted
61	19.817	95.549	96.170	93.654	Deleted
62	20.150	95.387	96.020	93.589	Deleted
63	20.483	95.228	95.870	93.493	Deleted
64	20.817	95.023	95.719	93.419	Deleted
65	21.150	94.915	95.580	93.331	Deleted
66	21.483	94.765	95.430	93.246	Deleted
67	21.817	94.637	95.291	93.170	Deleted
68	22.150	94.506	95.163	93.096	Deleted
69	22.483	94.378	95.033	93.022	Deleted
70	22.817	94.234	94.933	92.952	Deleted
71	23.150	94.108	94.787	92.872	Deleted
72	23.483	94.012	94.659	92.795	Deleted
73	23.817	93.895	94.552	92.730	Deleted
74	24.150	93.749	94.440	92.674	Deleted
75	24.483	93.645	94.316	92.591	Deleted
76	24.817	93.583	94.220	92.549	Deleted
77	25.150	93.463	94.112	92.464	Deleted
78	25.483	93.378	94.005	92.410	Deleted

Stabilization Data

Sample Number	TEST TIME	RTD 17 DEG F	RTD 18 DEG F	RTD 19 DEG F	RTD 20 DEG F
79	25.817	93.281	93.897	92.345	Deleted
80	26.150	93.185	93.790	92.280	Deleted
81	26.483	93.097	93.693	92.217	Deleted
82	26.817	92.980	93.608	92.163	Deleted
83	27.150	92.904	93.512	92.110	Deleted
84	27.483	92.825	93.422	92.051	Deleted
85	27.817	92.722	93.319	91.991	Deleted
86	28.150	92.648	93.234	91.937	Deleted
87	28.483	92.529	93.158	91.883	Deleted
88	28.817	92.452	93.061	91.820	Deleted

Stabilization Data

Sample Number	TEST TIME	RTD 21 DEG F	RTD 22 DEG F	RTD 23 DEG F	RTD 24 DEG F
31	9.817	99.575	99.300	100.09	99.832
32	10.150	97.817	97.800	98.112	98.133
33	10.483	96.926	96.760	96.956	96.911
34	10.817	96.335	96.247	96.324	96.449
35	11.150	95.916	95.850	96.097	96.159
36	11.483	95.455	95.624	95.831	95.912
37	11.817	95.220	95.411	95.723	95.687
38	12.150	95.036	95.230	95.573	95.483
39	12.483	94.865	95.046	95.360	95.333
40	12.817	94.737	94.896	95.199	95.171
41	13.150	94.618	94.768	95.080	95.032
42	13.483	94.490	94.641	94.941	94.881
43	13.817	94.371	94.511	94.825	94.785
44	14.150	94.237	94.387	94.710	94.682
45	14.483	94.136	94.275	94.610	94.592
46	14.817	94.028	94.168	94.502	94.484
47	15.150	93.911	94.063	94.386	94.376
48	15.483	93.815	93.955	94.321	94.291
49	15.817	93.718	93.859	94.244	94.194
50	16.150	93.620	93.772	94.171	94.098
51	16.483	93.535	93.666	94.063	93.981
52	16.817	93.418	93.579	93.978	93.916
53	17.150	93.330	93.494	93.882	93.820
54	17.483	93.234	93.409	93.785	93.734
55	17.817	93.149	93.324	93.720	93.615
56	18.150	93.063	93.236	93.624	93.561
57	18.483	92.967	93.162	93.550	93.465
58	18.817	92.891	93.077	93.485	93.368
59	19.150	92.805	92.927	93.411	93.314
60	19.483	92.769	92.838	93.342	93.213
61	19.817	92.689	92.755	93.261	93.153
62	20.150	92.619	92.677	93.172	93.117
63	20.483	92.538	92.596	93.100	93.014
64	20.817	92.469	92.526	93.042	92.946
65	21.150	92.388	92.446	92.950	92.863
66	21.483	92.280	92.338	92.885	92.778
67	21.817	92.233	92.291	92.838	92.753
68	22.150	92.141	92.200	92.746	92.670
69	22.483	92.088	92.135	92.703	92.616
70	22.817	92.011	92.070	92.618	92.531
71	23.150	91.980	92.007	92.576	92.500
72	23.483	91.915	91.942	92.511	92.446
73	23.817	91.852	91.877	92.446	92.361
74	24.150	91.794	91.830	92.390	92.334
75	24.483	91.744	91.761	92.329	92.253
76	24.817	91.702	91.696	92.265	92.210
77	25.150	91.637	91.642	92.211	92.156
78	25.483	91.583	91.600	92.137	92.102

Stabilization Data

Sample Number	TEST TIME	RTD 21 DEG F	RTD 22 DEG F	RTD 23 DEG F	RTD 24 DEG F
79	25.817	91.520	91.526	92.083	92.049
80	26.150	91.466	91.461	92.029	91.963
81	26.483	91.424	91.407	91.987	91.910
82	26.817	91.379	91.365	91.933	91.867
83	27.150	91.316	91.322	91.879	91.802
84	27.483	91.262	91.280	91.848	91.739
85	27.817	91.208	91.237	91.806	91.663
86	28.150	90.746	91.183	91.761	91.620
87	28.483	90.715	91.150	91.718	91.566
88	28.817	90.672	91.096	91.676	91.501

Stabilization Data

Sample Number	TEST TIME	RTD 25 DEG F	RTD 26 DEG F	RTD 27 DEG F	RTD 28 DEG F
31	9.817	105.78	99.629	98.998	99.187
32	10.150	103.61	97.940	97.357	97.664
33	10.483	102.45	96.834	96.501	96.485
34	10.817	101.74	96.297	96.030	95.606
35	11.150	101.22	95.899	95.804	95.286
36	11.483	100.80	95.620	95.537	95.071
37	11.817	100.48	95.405	95.344	94.869
38	12.150	100.19	95.234	95.183	94.719
39	12.483	99.924	95.083	94.990	94.580
40	12.817	99.677	94.975	94.851	94.450
41	13.150	99.431	94.793	94.701	94.311
42	13.483	99.206	94.685	94.583	94.150
43	13.817	98.991	94.589	94.444	94.011
44	14.150	98.769	94.443	94.309	93.877
45	14.483	98.563	94.319	94.197	93.787
46	14.817	98.379	94.191	94.092	93.691
47	15.150	98.197	94.072	93.973	93.583
48	15.483	98.005	93.966	93.854	93.518
49	15.817	97.834	93.870	93.758	93.422
50	16.150	97.650	93.805	93.673	93.294
51	16.483	97.491	93.685	93.556	93.209
52	16.817	97.307	93.580	93.480	93.122
53	17.150	97.137	93.526	93.395	93.048
54	17.483	96.987	93.429	93.319	92.951
55	17.817	96.825	93.321	93.223	92.844
56	18.150	96.666	93.236	93.149	92.801
57	18.483	96.516	93.171	93.073	92.727
58	18.817	96.366	93.095	92.999	92.694
59	19.150	96.205	93.009	92.914	92.609
60	19.483	96.061	92.919	92.833	92.519
61	19.817	95.893	92.838	92.752	92.481
62	20.150	95.772	92.791	92.674	92.412
63	20.483	95.615	92.751	92.602	92.340
64	20.817	95.483	92.715	92.544	92.262
65	21.150	95.337	92.591	92.452	92.192
66	21.483	95.219	92.506	92.378	92.127
67	21.817	95.098	92.448	92.342	92.091
68	22.150	94.963	92.344	92.239	92.000
69	22.483	94.833	92.290	92.174	91.946
70	22.817	94.705	92.236	92.121	91.881
71	23.150	94.587	92.194	92.024	91.827
72	23.483	94.481	92.117	91.971	91.773
73	23.817	94.374	92.066	91.906	91.708
74	24.150	94.251	92.018	91.850	91.664
75	24.483	94.139	91.947	91.778	91.592
76	24.817	94.042	91.881	91.693	91.549
77	25.150	93.944	91.839	91.617	91.496
78	25.483	93.839	91.774	91.543	91.420

Stabilization Data

Sample Number	TEST TIME	RTD 25 DEG F	RTD 26 DEG F	RTD 27 DEG F	RTD 28 DEG F
79	25.817	93.731	91.742	91.478	91.377
80	26.150	93.635	91.668	91.413	91.334
81	26.483	93.538	91.614	91.339	91.303
82	26.817	93.453	91.571	91.286	91.227
83	27.150	93.357	91.506	91.212	91.196
84	27.483	93.261	91.475	91.158	91.131
85	27.817	93.173	91.441	91.082	91.088
86	28.150	93.088	91.378	91.008	91.034
87	28.483	93.003	91.356	90.932	90.981
88	28.817	92.918	91.282	90.835	90.907

Stabilization Data

Sample Number	TEST TIME	RTD 29 DEG F	RTD 30 DEG F	RTD 31 DEG F	RTD 32 DEG F
31	9.817	110.36	112.32	112.16	112.40
32	10.150	107.61	109.41	109.35	109.53
33	10.483	105.73	107.31	107.29	107.35
34	10.817	104.44	105.82	105.68	105.92
35	11.150	103.67	104.73	104.56	104.82
36	11.483	102.99	103.80	103.75	103.94
37	11.817	102.52	103.10	103.00	103.28
38	12.150	101.90	102.51	102.38	102.67
39	12.483	101.49	101.93	101.79	102.11
40	12.817	101.04	101.47	101.27	101.63
41	13.150	100.70	101.06	100.85	101.11
42	13.483	100.39	100.65	100.47	100.73
43	13.817	100.08	100.25	100.09	100.41
44	14.150	99.774	99.886	99.718	100.08
45	14.483	99.502	99.581	99.413	99.788
46	14.817	99.222	99.237	99.082	99.509
47	15.150	98.955	98.959	98.793	99.220
48	15.483	98.697	98.669	98.471	98.950
49	15.817	98.439	98.422	98.204	98.692
50	16.150	98.192	98.175	97.862	98.456
51	16.483	97.978	97.928	97.669	98.200
52	16.817	97.743	97.715	97.392	97.962
53	17.150	97.559	97.488	97.049	97.738
54	17.483	97.323	97.275	96.812	97.513
55	17.817	97.119	97.059	96.599	97.287
56	18.150	96.937	96.855	96.331	97.094
57	18.483	96.744	96.662	96.107	96.912
58	18.817	96.562	96.491	95.946	96.739
59	19.150	96.390	96.298	95.733	96.546
60	19.483	96.215	96.132	95.548	96.382
61	19.817	96.037	95.966	95.337	96.203
62	20.150	95.914	95.811	95.161	96.050
63	20.483	95.757	95.631	94.962	95.870
64	20.817	95.604	95.499	94.798	95.760
65	21.150	95.456	95.322	94.630	95.592
66	21.483	95.329	95.182	94.481	95.430
67	21.817	95.207	95.070	94.349	95.309
68	22.150	95.039	94.913	94.203	95.163
69	22.483	94.911	94.774	94.011	95.013
70	22.817	94.804	94.666	93.872	94.905
71	23.150	94.676	94.550	93.680	94.778
72	23.483	94.557	94.399	93.519	94.659
73	23.817	94.438	94.291	93.349	94.551
74	24.150	94.328	94.179	93.226	94.430
75	24.483	94.214	94.076	93.134	94.315
76	24.817	94.095	93.959	92.995	94.208
77	25.150	93.999	93.852	92.888	94.134
78	25.483	93.893	93.744	92.749	93.994

Stabilization Data

Sample Number	TEST TIME	RTD 29 DEG F	RTD 30 DEG F	RTD 31 DEG F	RTD 32 DEG F
79	25.817	93.797	93.636	92.642	93.887
80	26.150	93.700	93.529	92.535	93.768
81	26.483	93.593	93.443	92.430	93.683
82	26.817	93.496	93.347	92.334	93.683
83	27.150	93.400	93.250	92.238	93.575
84	27.483	93.312	93.154	92.141	93.490
85	27.817	93.227	93.057	92.043	93.351
86	28.150	93.142	92.972	91.916	93.265
87	28.483	93.057	92.896	91.819	93.212
88	28.817	92.969	92.822	91.681	93.147

Stabilization Data

Sample Number	TEST TIME	RTD 33 DEG F	RTD 34 DEG F	RTD 35 DEG F	RTD 36 DEG F
31	9.817	112.76	111.99	111.14	111.66
32	10.150	109.82	109.44	108.53	109.26
33	10.483	107.57	107.56	106.63	106.94
34	10.817	106.12	106.06	105.36	105.62
35	11.150	105.10	105.02	104.27	104.47
36	11.483	104.18	104.12	103.40	103.71
37	11.817	103.44	103.42	102.70	103.01
38	12.150	102.82	102.77	102.12	102.36
39	12.483	102.18	102.19	101.65	101.81
40	12.817	101.70	101.73	101.22	101.27
41	13.150	101.27	101.30	100.82	100.93
42	13.483	100.88	100.91	100.45	100.61
43	13.817	100.46	100.54	100.11	100.11
44	14.150	100.09	100.20	99.792	99.826
45	14.483	99.777	99.908	99.475	99.512
46	14.817	99.465	99.584	99.165	99.200
47	15.150	99.167	99.306	98.864	98.964
48	15.483	98.898	99.027	98.574	98.717
49	15.817	98.608	98.780	98.273	98.461
50	16.150	98.361	98.521	98.038	98.169
51	16.483	98.114	98.274	97.779	97.924
52	16.817	97.890	98.049	97.555	97.709
53	17.150	97.654	97.833	97.319	97.493
54	17.483	97.450	97.619	97.081	97.257
55	17.817	97.246	97.404	96.879	97.053
56	18.150	97.031	97.210	96.664	96.871
57	18.483	96.849	97.006	96.459	96.667
58	18.817	96.678	96.835	96.266	96.496
59	19.150	96.485	96.651	96.062	96.303
60	19.483	96.308	96.487	95.909	96.160
61	19.817	96.151	96.309	95.718	95.991
62	20.150	95.987	96.154	95.512	95.827
63	20.483	95.830	95.985	95.323	95.670
64	20.817	95.687	95.842	95.211	95.493
65	21.150	95.669	95.684	95.023	95.381
66	21.483	95.510	95.556	94.807	95.208
67	21.817	95.366	95.435	94.675	95.098
68	22.150	95.209	95.278	94.506	94.961
69	22.483	95.079	95.136	94.367	94.802
70	22.817	94.974	95.030	94.251	94.694
71	23.150	94.844	94.900	94.109	94.564
72	23.483	94.727	94.783	93.970	94.436
73	23.817	94.597	94.664	93.874	94.339
74	24.150	94.487	94.554	93.741	94.218
75	24.483	94.362	94.439	93.627	94.104
76	24.817	94.254	94.320	93.510	93.985
77	25.150	94.115	94.224	93.360	93.877
78	25.483	94.072	94.107	93.252	93.781

Stabilization Data

Sample Number	TEST TIME	RTD 33 DEG F	RTD 34 DEG F	RTD 35 DEG F	RTD 36 DEG F
79	25.817	93.953	94.019	93.187	93.675
80	26.150	93.848	93.903	93.048	93.567
81	26.483	93.740	93.806	92.963	93.491
82	26.817	93.633	93.709	92.824	93.386
83	27.150	93.548	93.622	92.727	93.289
84	27.483	93.440	93.516	92.619	93.193
85	27.817	93.355	93.420	92.512	93.116
86	28.150	93.258	93.332	92.404	93.020
87	28.483	93.086	93.247	92.202	92.935
88	28.817	93.023	93.161	92.061	92.850

Stabilization Data

Sample Number	TEST TIME	RTD 37 DEG F	RTD 38 DEG F	RTD 39 DEG F	RTD 40 DEG F
31	9.817	112.37	Deleted	111.64	112.16
32	10.100	109.63	Deleted	108.70	109.81
33	10.483	107.43	Deleted	106.54	107.66
34	10.817	106.12	Deleted	105.06	106.27
35	11.150	105.02	Deleted	103.94	105.13
36	11.483	104.29	Deleted	102.97	104.22
37	11.817	103.38	Deleted	102.23	103.48
38	12.150	102.78	Deleted	101.50	102.88
39	12.483	102.21	Deleted	100.92	102.17
40	12.817	101.68	Deleted	100.35	101.63
41	13.150	101.23	Deleted	99.861	101.20
42	13.483	100.82	Deleted	99.443	100.75
43	13.817	100.46	Deleted	99.024	100.37
44	14.150	100.09	Deleted	98.653	100.01
45	14.483	99.772	Deleted	98.285	99.698
46	14.817	99.449	Deleted	97.951	99.382
47	15.150	99.148	Deleted	97.653	99.063
48	15.483	98.850	Deleted	97.363	98.742
49	15.817	98.612	Deleted	97.094	98.473
50	16.150	98.376	Deleted	96.836	98.217
51	16.483	98.109	Deleted	96.601	97.959
52	16.817	97.917	Deleted	96.343	97.744
53	17.150	97.681	Deleted	96.118	97.526
54	17.483	97.454	Deleted	95.903	97.304
55	17.817	97.241	Deleted	95.690	97.068
56	18.150	97.046	Deleted	95.486	96.875
57	18.483	96.853	Deleted	95.304	96.671
58	18.817	96.683	Deleted	95.123	96.487
59	19.150	96.468	Deleted	94.939	96.317
60	19.483	96.315	Deleted	94.775	96.144
61	19.817	96.158	Deleted	94.596	95.982
62	20.150	95.981	Deleted	94.432	95.812
63	20.483	95.835	Deleted	94.275	95.662
64	20.817	95.692	Deleted	94.132	95.480
65	21.150	95.503	Deleted	93.963	95.361
66	21.483	95.376	Deleted	93.836	95.189
67	21.817	95.263	Deleted	93.724	95.049
68	22.150	95.106	Deleted	93.558	94.922
69	22.483	94.979	Deleted	93.439	94.792
70	22.817	94.840	Deleted	93.300	94.648
71	23.150	94.721	Deleted	93.172	94.536
72	23.483	94.582	Deleted	93.053	94.386
73	23.817	94.474	Deleted	92.926	94.278
74	24.150	94.364	Deleted	92.813	94.166
75	24.483	94.239	Deleted	92.699	94.052
76	24.817	94.142	Deleted	92.592	93.935
77	25.150	94.035	Deleted	92.486	93.816
78	25.483	93.927	Deleted	92.379	93.666

Stabilization Data

Sample Number	TEST TIME	RTD 37 DEG F	RTD 38 DEG F	RTD 39 DEG F	RTD 40 DEG F
79	25.817	93.811	Deleted	92.282	93.569
80	26.150	93.703	Deleted	92.175	93.442
81	26.483	93.607	Deleted	92.078	93.354
82	26.817	93.521	Deleted	91.982	93.249
83	27.150	93.414	Deleted	91.886	93.161
84	27.483	93.329	Deleted	91.789	93.083
85	27.817	93.253	Deleted	91.704	92.980
86	28.150	93.156	Deleted	91.608	92.895
87	28.483	93.071	Deleted	91.520	92.787
88	28.817	92.986	Deleted	91.435	92.722

Stabilization Data

Sample Number	TEST TIME	RHD 1 % RH	RHD 2 % RH	RHD 3 % RH	RHD 4 % RH
31	9.817	41.75	47.51	39.31	52.19
32	10.150	42.60	48.52	39.88	57.21
33	10.483	42.87	49.26	40.88	60.08
34	10.817	43.25	49.82	41.62	56.52
35	11.150	43.54	49.99	43.43	63.05
36	11.483	43.66	50.39	45.27	66.99
37	11.817	43.79	51.00	46.34	72.35
38	12.150	43.90	51.55	47.18	72.18
39	12.483	44.06	52.11	47.77	72.48
40	12.817	44.23	52.68	48.29	73.80
41	13.150	44.41	53.31	49.02	74.53
42	13.483	44.59	53.84	49.59	75.36
43	13.817	44.82	54.32	50.18	76.06
44	14.150	45.06	54.76	50.76	77.24
45	14.483	45.33	55.10	51.28	77.87
46	14.817	45.55	55.49	51.77	77.90
47	15.150	45.83	55.84	52.27	78.58
48	15.483	46.11	56.22	52.78	79.08
49	15.817	46.30	56.47	53.20	79.41
50	16.150	46.58	56.80	53.63	79.60
51	16.483	46.81	57.09	54.04	79.82
52	16.817	47.12	57.40	54.45	79.96
53	17.150	47.43	57.82	54.85	80.11
54	17.483	47.69	58.21	55.21	80.23
55	17.817	47.86	58.57	55.55	80.13
56	18.150	48.15	58.96	55.91	80.18
57	18.483	48.54	59.27	56.20	80.24
58	18.817	48.73	59.54	56.52	80.55
59	19.150	49.02	59.81	56.80	80.47
60	19.483	49.26	60.09	57.06	80.51
61	19.817	49.61	60.39	57.44	80.51
62	20.150	49.76	60.67	57.79	80.67
63	20.483	49.92	60.96	58.18	80.58
64	20.817	50.15	61.25	58.50	80.89
65	21.150	50.48	61.55	58.81	80.80
66	21.483	50.71	61.84	59.15	81.00
67	21.817	50.98	62.11	59.45	80.92
68	22.150	51.19	62.36	59.76	81.08
69	22.483	51.45	62.63	60.04	81.14
70	22.817	51.62	62.88	60.36	81.24
71	23.150	51.96	63.17	60.64	81.30
72	23.483	52.22	63.39	60.91	81.28
73	23.817	52.51	63.66	61.20	81.29
74	24.150	52.76	63.88	61.49	81.26
75	24.483	52.93	64.13	61.77	81.38
76	24.817	53.18	64.35	62.03	81.30
77	25.150	53.36	64.62	62.29	81.36
78	25.483	53.69	64.81	62.57	81.42

Stabilization Data

Sample Number	TEST TIME	RHD 1 % RH	RHD 2 % RH	RHD 3 % RH	RHD 4 % RH
79	25.817	53.90	65.04	62.80	81.58
80	26.150	54.06	65.25	63.07	81.54
81	26.483	54.26	65.46	63.30	81.52
82	26.817	54.50	65.69	63.55	81.45
83	27.150	54.68	65.92	63.82	81.56
84	27.483	54.94	66.13	64.06	81.55
85	27.817	55.10	66.31	64.28	81.57
86	28.150	55.31	66.49	64.53	81.57
87	28.483	55.50	66.68	64.77	81.48
88	28.817	55.67	66.84	64.99	81.46

Stabilization Data

Sample Number	TEST TIME	RHD 5 % RH	RHD 6 % RH	RHD 7 % RH	RHD 8 % RH
31	9.817	80.28	83.1	78.05	57.56
32	10.150	81.47	84.53	81.03	60.93
33	10.483	81.89	85.28	82.86	62.88
34	10.817	86.56	82.33	83.05	64.83
35	11.150	79.84	81.54	82.63	68.41
36	11.483	87.83	80.85	82.19	72.70
37	11.817	87.52	77.83	81.61	78.79
38	12.150	86.81	77.10	81.21	82.49
39	12.483	87.23	76.87	80.86	84.71
40	12.817	87.09	76.08	80.95	86.00
41	13.150	86.74	76.04	80.90	86.47
42	13.483	86.28	74.69	81.00	86.69
43	13.817	85.77	73.63	81.01	87.35
44	14.150	85.98	73.36	81.02	87.84
45	14.483	85.65	73.16	81.05	88.24
46	14.817	85.51	72.83	81.25	89.00
47	15.150	85.51	71.72	81.17	89.96
48	15.483	85.67	71.48	80.90	89.84
49	15.817	85.71	70.03	80.90	90.36
50	16.150	85.49	69.53	80.88	91.56
51	16.483	85.38	70.43	80.82	91.28
52	16.817	84.77	69.85	80.82	91.71
53	17.150	84.55	69.31	80.69	92.23
54	17.483	84.29	70.28	80.86	92.46
55	17.817	84.19	70.00	80.57	93.01
56	18.150	84.18	70.72	80.42	93.38
57	18.483	84.30	70.89	80.44	93.54
58	18.817	84.60	70.58	80.66	93.95
59	19.150	84.47	70.60	80.70	95.04
60	19.483	84.36	71.12	80.68	94.61
61	19.817	84.41	71.61	80.56	94.79
62	20.150	84.56	71.85	80.63	95.63
63	20.483	84.36	70.81	80.69	95.42
64	20.817	84.39	71.56	80.71	95.68
65	21.150	84.50	71.63	80.48	96.02
66	21.483	84.60	72.04	80.47	96.30
67	21.817	84.63	71.93	80.49	96.57
68	22.150	84.96	71.60	80.57	97.68
69	22.483	85.22	71.68	80.21	97.08
70	22.817	85.27	71.26	80.09	97.27
71	23.150	85.14	71.39	80.09	97.44
72	23.483	85.01	71.12	80.37	97.67
73	23.817	85.15	70.58	80.42	97.90
74	24.150	85.18	71.22	80.41	98.02
75	24.483	85.16	71.32	79.78	99.12
76	24.817	85.08	71.36	79.51	99.12
77	25.150	85.02	71.11	79.59	98.60
78	25.483	84.81	72.24	79.64	99.27

Stabilization Data

Sample Number	TEST TIME	RHD 5 % RH	RHD 6 % RH	RHD 7 % RH	RHD 8 % RH
79	25.817	84.81	72.35	79.42	99.38
80	26.150	84.97	71.64	79.42	99.25
81	26.483	84.95	72.48	78.96	99.28
82	26.817	85.05	71.23	78.96	99.74
83	27.150	85.12	72.67	78.92	99.72
84	27.483	85.17	72.54	78.93	100.12
85	27.817	85.15	72.30	79.07	101.01
86	28.150	85.16	72.20	79.35	100.42
87	28.483	85.20	72.84	79.29	100.46
88	28.817	85.14	72.85	79.81	100.70

Stabilization Data

Sample Number	TEST TIME	RHD 9 % RH	RHD 10 % RH
31	9.817	60.04	64.60
32	10.150	61.87	65.83
33	10.483	65.53	63.36
34	10.817	68.20	63.91
35	11.150	69.58	64.54
36	11.483	71.49	66.73
37	11.817	73.00	70.76
38	12.150	75.58	73.93
39	12.483	78.44	76.61
40	12.817	79.66	77.74
41	13.150	80.77	78.78
42	13.483	81.77	79.80
43	13.817	82.67	80.83
44	14.150	83.42	81.65
45	14.483	84.13	82.41
46	14.817	84.80	83.14
47	15.150	85.39	83.75
48	15.483	85.99	84.35
49	15.817	86.57	84.94
50	16.150	87.04	85.46
51	16.483	87.57	85.97
52	16.817	88.07	86.46
53	17.150	88.57	87.04
54	17.483	88.93	87.37
55	17.817	89.39	87.86
56	18.150	89.84	88.32
57	18.483	90.27	88.70
58	18.817	90.63	89.07
59	19.150	90.96	89.55
60	19.483	91.34	89.92
61	19.817	91.73	90.26
62	20.150	92.02	90.46
63	20.483	92.43	90.95
64	20.817	92.73	91.17
65	21.150	93.06	91.49
66	21.483	93.34	91.89
67	21.817	93.72	92.22
68	22.150	94.05	92.38
69	22.483	94.41	92.60
70	22.817	94.69	92.95
71	23.150	95.01	93.25
72	23.483	95.28	93.73
73	23.817	95.58	93.98
74	24.150	95.94	94.31
75	24.483	96.26	94.67
76	24.817	96.61	95.02
77	25.150	97.02	95.44
78	25.483	97.34	95.66

Stabilization Data

Sample Number	TEST TIME	RHD 9 % RH	RHD 10 % RH
79	25.817	97.66	95.87
80	26.150	97.99	96.14
81	26.483	98.33	96.61
82	26.817	98.61	96.80
83	27.150	98.91	97.23
84	27.483	99.17	97.44
85	27.817	99.44	97.72
86	28.150	99.67	98.07
87	28.483	99.89	98.45
88	28.817	100.12	98.57

Stabilization Data

Sample Number	TEST TIME	VAPOR PRESSURE PSIA	CONT. PRESSURE PSIA
31	9.817	0.7121	58.480
32	10.150	0.6879	58.219
33	10.483	0.6673	58.095
34	10.817	0.6543	58.014
35	11.150	0.6484	57.954
36	11.483	0.6606	57.905
37	11.817	0.6700	57.863
38	12.150	0.6739	57.827
39	12.483	0.6777	57.794
40	12.817	0.6767	57.765
41	13.150	0.6751	57.737
42	13.483	0.6723	57.712
43	13.817	0.6700	57.689
44	14.150	0.6689	57.667
45	14.483	0.6669	57.646
46	14.817	0.6651	57.626
47	15.150	0.6632	57.607
48	15.483	0.6607	57.589
49	15.817	0.6581	57.571
50	16.150	0.6568	57.554
51	16.483	0.6550	57.538
52	16.817	0.6525	57.522
53	17.150	0.6507	57.507
54	17.483	0.6493	57.493
55	17.817	0.6475	57.478
56	18.150	0.6466	57.465
57	18.483	0.6452	57.452
58	18.817	0.6442	57.439
59	19.150	0.6435	57.426
60	19.483	0.6418	57.414
61	19.817	0.6407	57.402
62	20.150	0.6404	57.391
63	20.483	0.6378	57.380
64	20.817	0.6375	57.369
65	21.150	0.6365	57.358
66	21.483	0.6360	57.348
67	21.817	0.6353	57.338
68	22.150	0.6352	57.328
69	22.483	0.6332	57.318
70	22.817	0.6323	57.309
71	23.150	0.6314	57.300
72	23.483	0.6306	57.291
73	23.817	0.6296	57.282
74	24.150	0.6294	57.273
75	24.483	0.6295	57.265
76	24.817	0.6286	57.256
77	25.150	0.6274	57.248

Stabilization Data

Sample Number	TEST TIME	VAPOR PRESSURE PSIA	CONT. PRESSURE PSIA
78	25.483	0.6280	57.240
79	25.817	0.6274	57.232
80	26.150	0.6260	57.224
81	26.483	0.6259	57.217
82	26.817	0.6248	57.209
83	27.150	0.6254	57.202
84	27.483	0.6251	57.195
85	27.817	0.6252	57.187
86	28.150	0.6241	57.180
87	28.483	0.6238	57.174
88	28.817	0.6235	57.167

Stabilization Data

Sample Number	TEST TIME	CONT. AVERAGE TEMP	DELTA T/HR LAST 2 HRS	DELTA T/HR LAST 1 HR	1HR to 2HR DELTA T/HR CHANGE	
31	9.817	102.892				
32	10.150	100.892				
33	10.483	99.603				
34	10.817	98.810		-4.082		
35	11.150	98.253		-2.639		
36	11.483	97.813		-1.790		
37	11.817	97.451	-2.721	-1.359		
38	12.150	97.139	-1.877	-1.114	0.763	
39	12.483	96.847	-1.378	-0.966	0.412	
40	12.817	96.590	-1.110	-0.861	0.249	
41	13.150	96.362	-0.946	-0.777	0.169	
42	13.483	96.147	-0.833	-0.700	0.133	
43	13.817	95.940	-0.756	-0.650	0.106	*
44	14.150	95.739	-0.700	-0.623	0.077	*
45	14.483	95.549	-0.649	-0.598	0.051	*
46	14.817	95.367	-0.612	-0.573	0.039	*
47	15.150	95.185	-0.589	-0.554	0.035	*
48	15.483	95.014	-0.567	-0.535	0.032	*
49	15.817	94.855	-0.543	-0.512	0.031	*
50	16.150	94.700	-0.520	-0.485	0.035	*
51	16.483	94.550	-0.500	-0.464	0.036	*
52	16.817	94.402	-0.483	-0.453	0.030	*
53	17.150	94.265	-0.460	-0.435	0.025	*
54	17.483	94.120	-0.447	-0.430	0.017	*
55	17.817	93.983	-0.436	-0.419	0.017	*
56	18.150	93.854	-0.423	-0.411	0.012	*
57	18.483	93.726	-0.412	-0.394	0.018	*
58	18.817	93.604	-0.399	-0.379	0.020	*
59	19.150	93.483	-0.391	-0.371	0.020	*
60	19.483	93.369	-0.376	-0.357	0.019	*
61	19.817	93.255	-0.364	-0.349	0.015	*
62	20.150	93.148	-0.353	-0.335	0.018	*
63	20.483	93.041	-0.343	-0.328	0.015	*
64	20.817	92.942	-0.331	-0.313	0.018	*
65	21.150	92.838	-0.323	-0.310	0.013	*
66	21.483	92.737	-0.316	-0.304	0.012	*
67	21.817	92.652	-0.302	-0.290	0.012	*
68	22.150	92.551	-0.299	-0.287	0.012	*
69	22.483	92.461	-0.290	-0.276	0.014	*
70	22.817	92.377	-0.283	-0.275	0.008	*
71	23.150	92.289	-0.275	-0.262	0.013	*
72	23.483	92.204	-0.267	-0.257	0.010	*
73	23.817	92.119	-0.267	-0.258	0.009	*
74	24.150	92.046	-0.253	-0.243	0.010	*
75	24.483	91.963	-0.249	-0.241	0.008	*
76	24.817	91.892	-0.243	-0.227	0.016	*
77	25.150	91.820	-0.235	-0.226	0.009	*

Stabilization Data

Sample Number	TEST TIME	CONT. AVERAGE TEMP	DELTA T/HR LAST 2 HRS	DELTA T/HR LAST 1 HR	1HR to 2HR DELTA T/HR CHANGE	
78	25.483	91.743	-0.231	-0.220	0.011	*
79	25.817	91.672	-0.224	-0.220	0.004	*
80	26.150	91.597	-0.225	-0.223	0.002	*
81	26.483	91.531	-0.216	-0.212	0.004	*
82	26.817	91.465	-0.214	-0.207	0.007	*
83	27.150	91.399	-0.211	-0.198	0.013	*
84	27.483	91.338	-0.203	-0.193	0.010	*
85	27.817	91.269	-0.202	-0.196	0.006	*
86	28.150	91.195	-0.201	-0.204	0.003	*
87	28.483	91.130	-0.201	-0.208	0.008	*
88	28.817	91.066	-0.200	-0.203	0.004	*

NOTES

1) THE 1 HOUR AND 2 HOUR DELTA TEMPERATURE VALUES ARE NOT VALID UNTIL 1 HOUR AND 2 HOURS, RESPECTIVELY, HAVE PASSED IN THE TEST

2) THE STABILIZATION CRITERIA IS MET WHEN:

   -THE HOURLY AVERAGE DELTA T FOR THE PRECEDING HOUR DIFFERS FROM THE HOURLY AVERAGE DELTA T FOR THE PRECEDING 2 HOURS BY LESS THAN 0.5 DEGREES F. OR

   -THE HOURLY AVERAGE DELTA T FOR THE PRECEDING 2 HOURS IS LESS THAN 1.0 DEGREES F.

   -THE STABILIZATION PERIOD IS A MINIMUM OF 4 HOURS

3) THE "*" INDICATES THAT THE STABILIZATION CRITERIA HAS BEEN MET.

Stabilization Period

St.Lucie Unit 2 June 1992

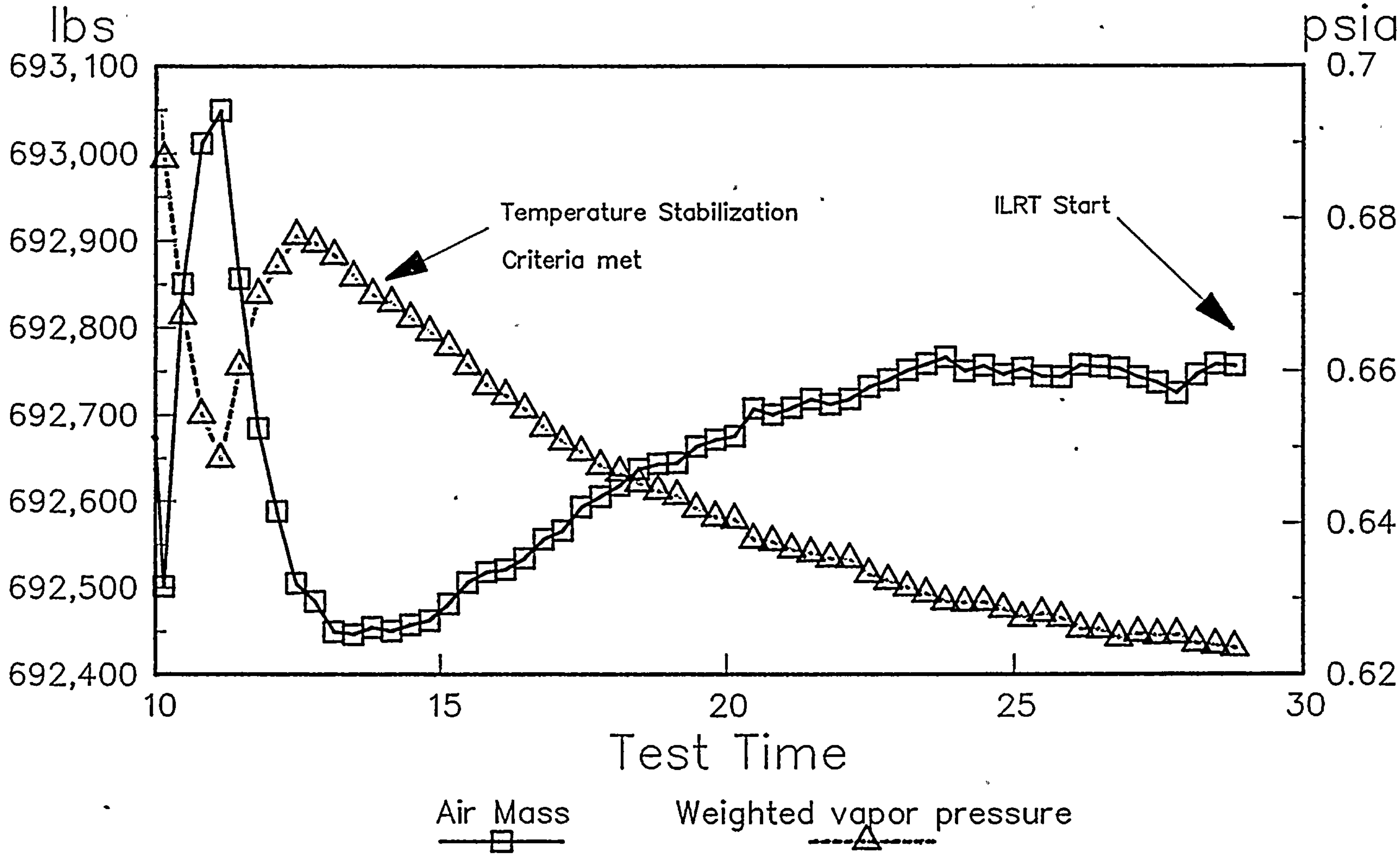
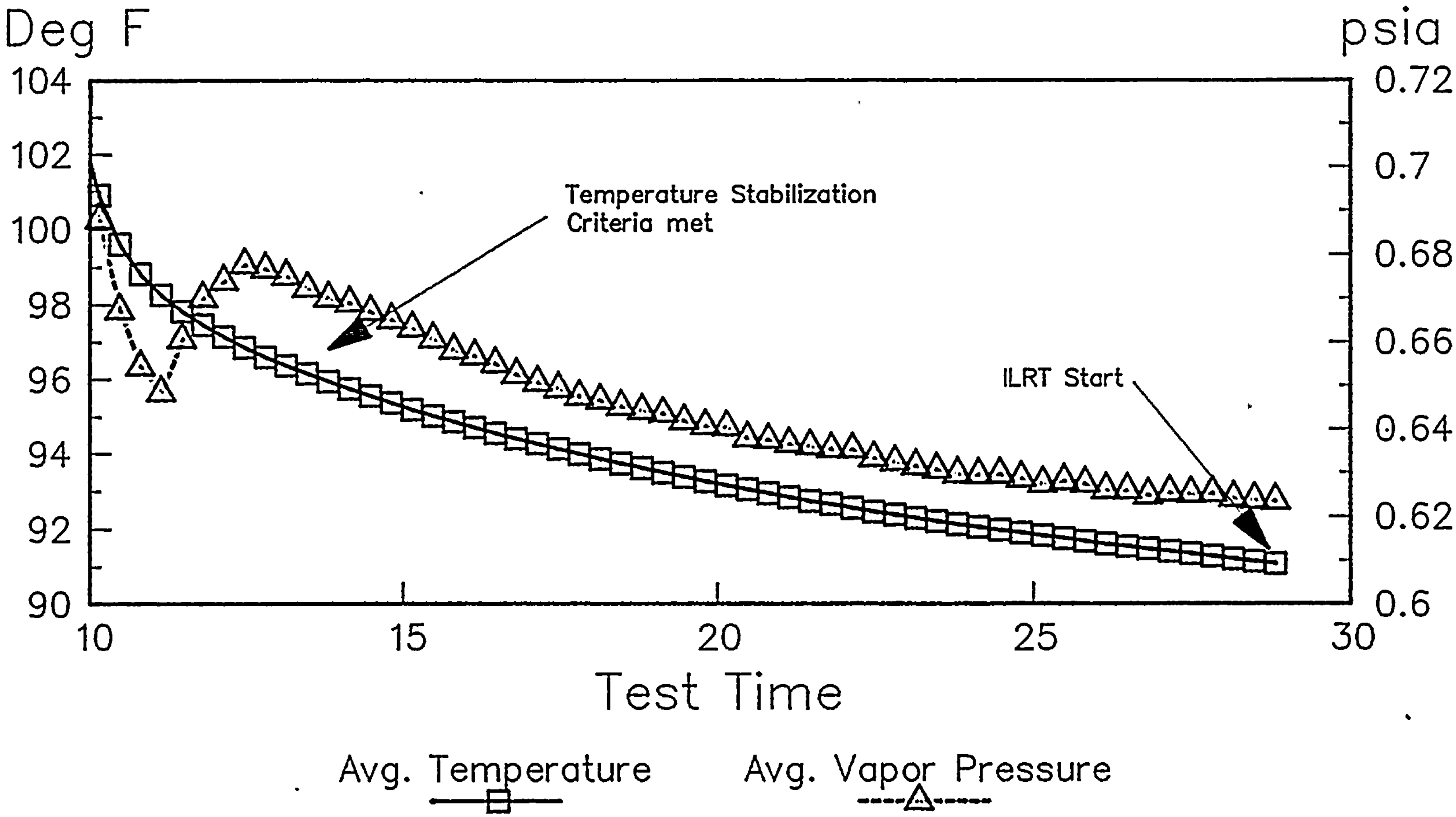


Figure G 64

Note inverse trends of airmass vs vapor pressure

Stabilization Period

St. Lucie Unit 2 June 1992

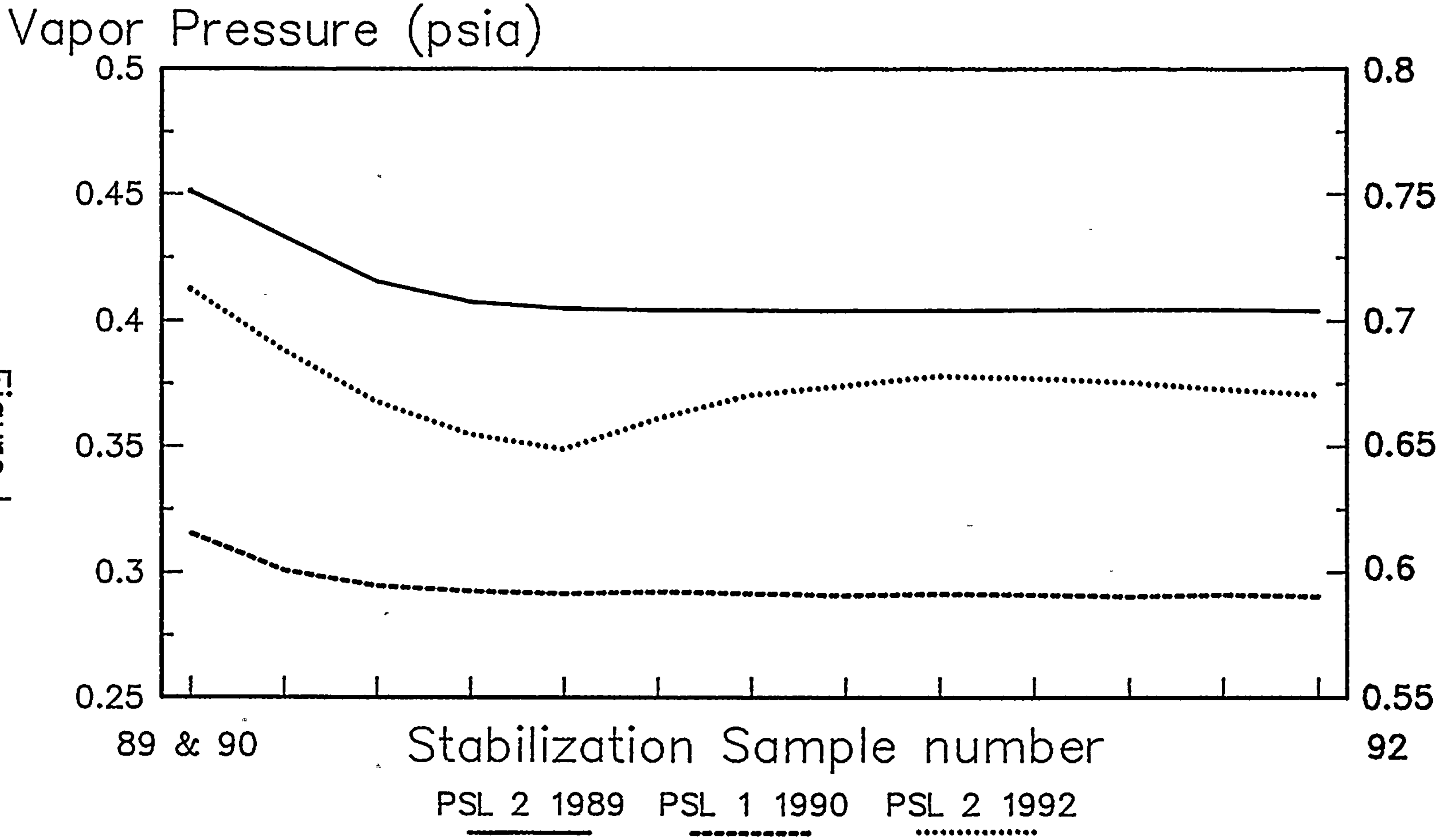


Stabilization extended after temperature
criteria met due to vapor pressure affects

Figure H

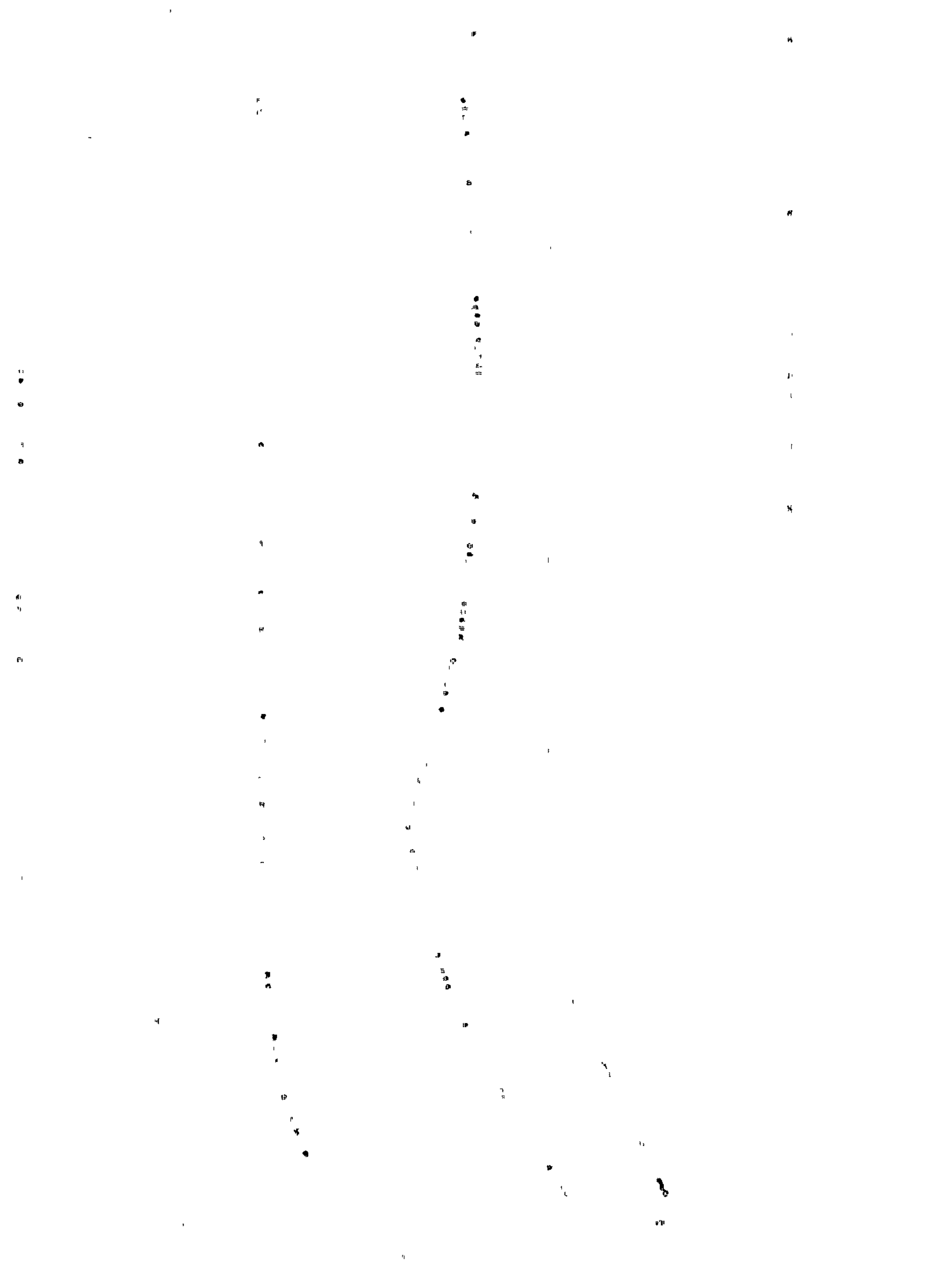
Comparison of Different Vapor Pressure Trends

Historical vs Latest ILRTs at St. Lucie



PSL 2 1992 Vapor Pressure Scale Offset

Figure I



% RH by Elevation During Stabilization Period

St. Lucie Unit 2 June 1992

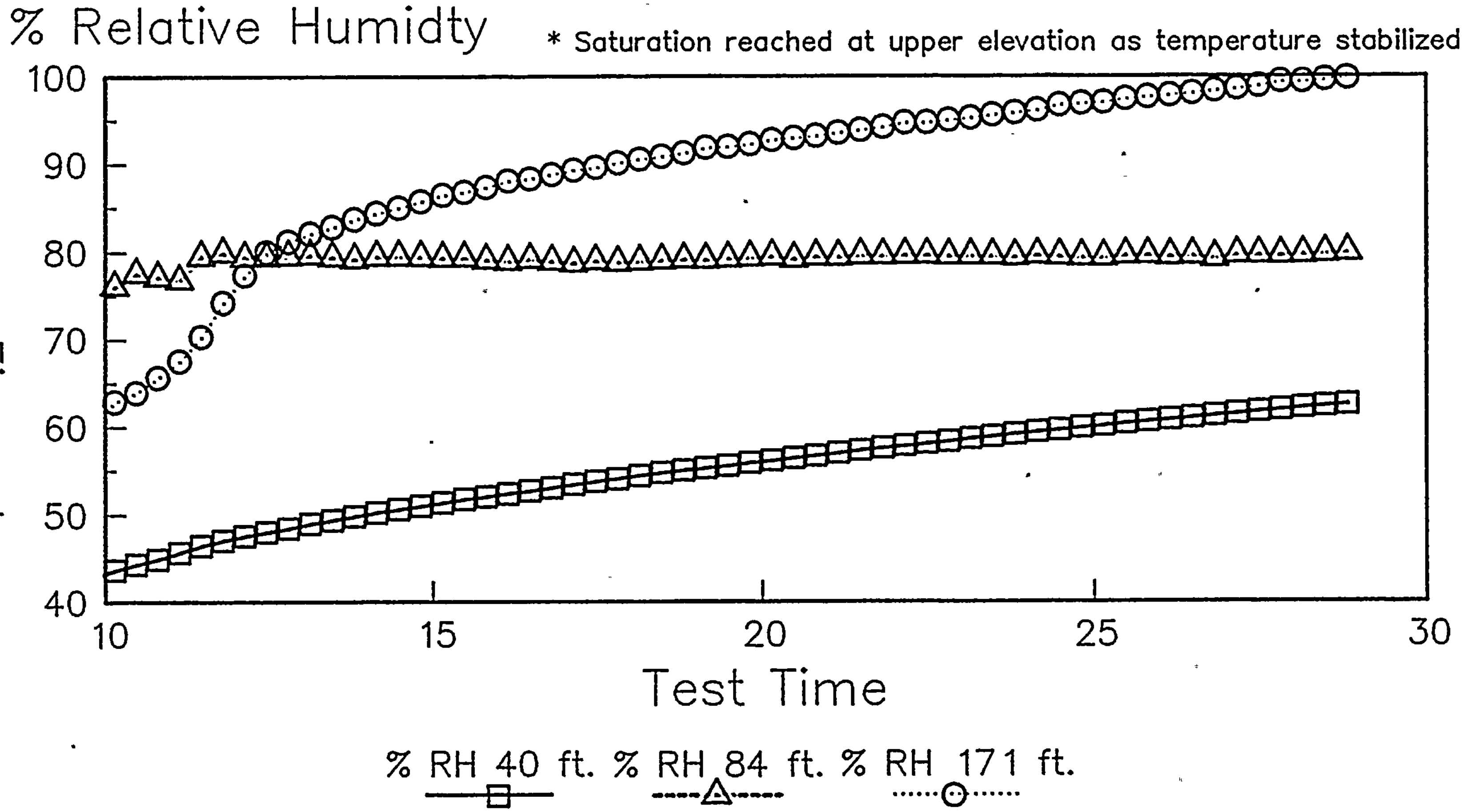
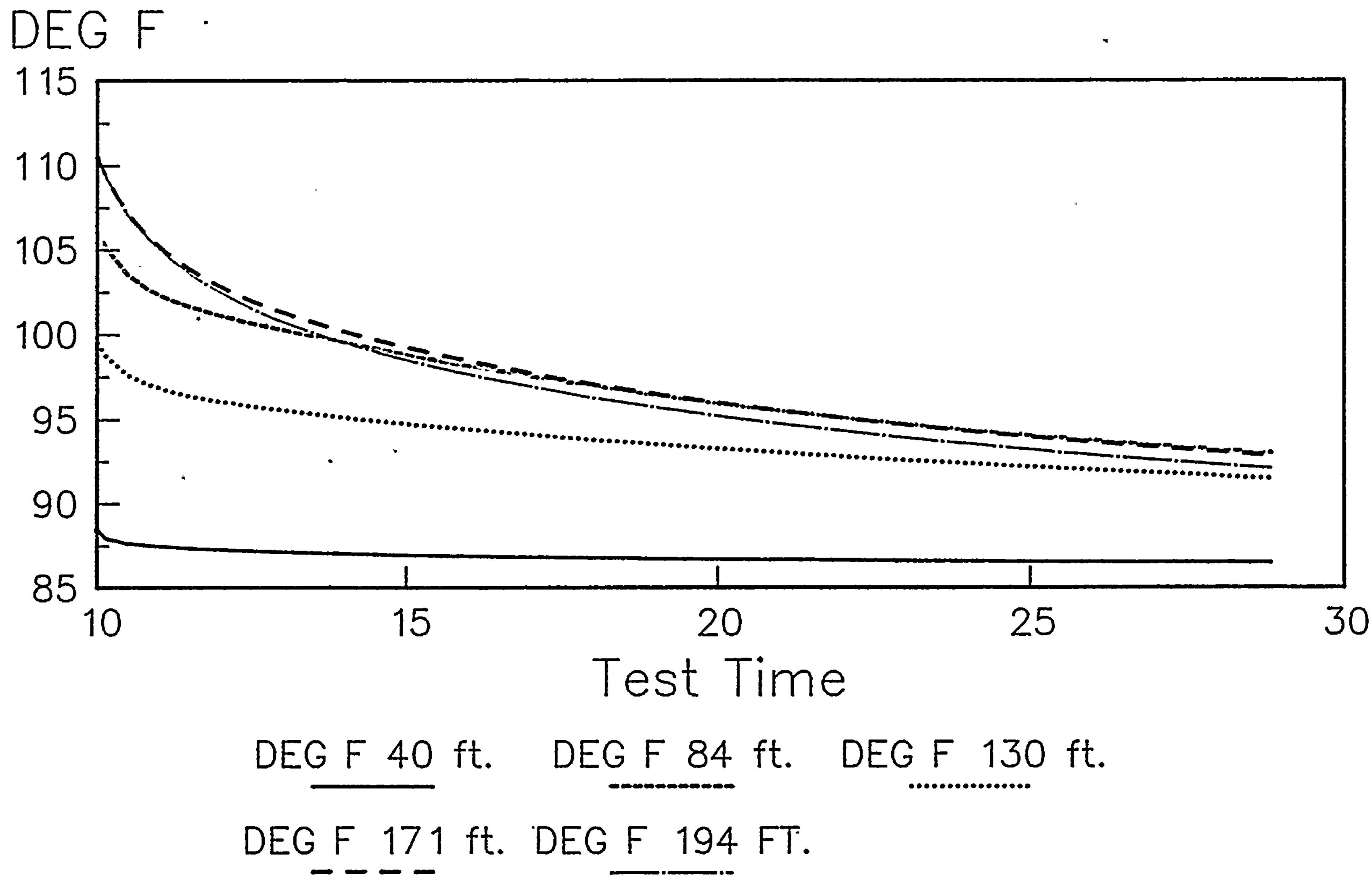


Figure J
67

Note minimal of mixing of water vapor by elevation

Temp by Elevation During Stabilization Period

St. Lucie Unit 2 June 1992



Note convergence of all groups above 62 ft.
operating deck

Figure K

ILRT DATA

ILRT Data

Sample Number	TEST TIME	RTD 1 DEG F	RTD 2 DEG F	RTD 3 DEG F	RTD 4 DEG F
89	29.150	86.770	87.370	86.592	86.045
90	29.483	86.752	87.352	86.585	86.038
91	29.817	86.743	87.343	86.585	86.027
92	30.150	86.752	87.343	86.574	86.018
93	30.483	86.752	87.343	86.574	86.027
94	30.817	86.732	87.321	86.585	86.018
95	31.150	86.743	87.321	86.574	86.018
96	31.483	86.743	87.310	86.562	86.018
97	31.817	86.743	87.310	86.574	86.018
98	32.150	86.710	87.299	86.574	86.007
99	32.483	86.732	87.290	86.562	86.007
100	32.817	86.721	87.290	86.562	86.007
101	33.150	86.732	87.278	86.562	85.996
102	33.483	86.721	87.278	86.574	85.996
103	33.817	86.721	87.278	86.562	85.996
104	34.150	86.721	87.267	86.562	85.996
105	34.483	86.728	87.263	86.558	86.003
106	34.817	86.728	87.263	86.558	86.003
107	35.150	86.705	87.252	86.558	86.003
108	35.483	86.710	87.247	86.542	85.985
109	35.817	86.716	87.243	86.558	85.991
110	36.150	86.698	87.225	86.551	85.985
111	36.483	86.698	87.225	86.542	85.985
112	36.817	86.698	87.214	86.551	85.973
113	37.150	86.689	87.214	86.542	85.985
114	37.483	86.705	87.209	86.549	85.991
115	37.817	86.698	87.202	86.542	85.985

ILRT Data

Sample Number	TEST TIME	RTD 5 DEG F	RTD 6 DEG F	RTD 7 DEG F	RTD 8 DEG F
89	29.150	85.931	86.484	86.638	86.024
90	29.483	85.924	86.479	86.622	86.007
91	29.817	85.913	86.479	86.622	86.007
92	30.150	85.913	86.468	86.622	86.007
93	30.483	85.913	86.457	86.611	85.995
94	30.817	85.902	86.457	86.600	85.986
95	31.150	85.902	86.457	86.600	85.995
96	31.483	85.913	86.457	86.600	85.995
97	31.817	85.902	86.446	86.589	85.986
98	32.150	85.893	86.446	86.589	85.995
99	32.483	85.893	86.434	86.589	85.975
100	32.817	85.893	86.434	86.578	85.975
101	33.150	85.882	86.425	86.578	85.964
102	33.483	85.882	86.425	86.578	85.975
103	33.817	85.882	86.425	86.569	85.975
104	34.150	85.882	86.414	86.569	85.964
105	34.483	85.899	86.421	86.575	85.971
106	34.817	85.888	86.421	86.575	85.959
107	35.150	85.888	86.421	86.564	85.959
108	35.483	85.882	86.403	86.557	85.953
109	35.817	85.888	86.410	86.564	85.959
110	36.150	85.882	86.403	86.546	85.953
111	36.483	85.882	86.403	86.546	85.953
112	36.817	85.882	86.392	86.546	85.953
113	37.150	85.882	86.392	86.546	85.944
114	37.483	85.877	86.398	86.542	85.948
115	37.817	85.870	86.392	86.526	85.944

ILRT Data

Sample Number	TEST TIME	RTD 9 DEG F	RTD 10 DEG F	RTD 11 DEG F	RTD 12 DEG F
89	29.150	93.268	92.511	93.104	92.774
90	29.483	93.187	92.419	93.013	92.660
91	29.817	93.111	92.345	92.937	92.586
92	30.150	93.026	92.268	92.863	92.500
93	30.483	92.949	92.194	92.787	92.424
94	30.817	92.876	92.118	92.713	92.359
95	31.150	92.799	92.055	92.637	92.285
96	31.483	92.737	91.979	92.563	92.200
97	31.817	92.629	91.905	92.498	92.135
98	32.150	92.564	91.840	92.433	92.081
99	32.483	92.510	91.763	92.371	91.995
100	32.817	92.437	91.709	92.295	91.930
101	33.150	92.372	91.658	92.221	91.856
102	33.483	92.318	91.593	92.156	91.803
103	33.817	92.253	91.539	92.102	91.726
104	34.150	92.179	91.474	92.037	91.652
105	34.483	92.132	91.415	91.993	91.605
106	34.817	92.067	91.352	91.917	91.540
107	35.150	92.013	91.299	91.863	91.486
108	35.483	91.953	91.238	91.803	91.394
109	35.817	91.897	91.202	91.745	91.367
110	36.150	91.836	91.153	91.686	91.298
111	36.483	91.771	91.110	91.633	91.244
112	36.817	91.729	91.130	91.579	91.179
113	37.150	91.664	91.065	91.525	91.136
114	37.483	91.628	90.998	91.490	91.089
115	37.817	91.579	90.895	91.429	91.028

ILRT Data

Sample Number	TEST TIME	RTD 13 DEG F	RTD 14 DEG F	RTD 15 DEG F	RTD 16 DEG F
89	29.150	93.102	92.370	93.087	93.069
90	29.483	93.042	92.257	92.983	92.978
91	29.817	92.965	92.192	92.898	92.892
92	30.150	92.858	92.096	92.833	92.816
93	30.483	92.827	92.019	92.748	92.753
94	30.817	92.750	91.934	92.672	92.677
95	31.150	92.676	91.806	92.598	92.561
96	31.483	92.600	91.752	92.533	92.334
97	31.817	92.526	91.687	92.459	92.238
98	32.150	92.119	91.622	92.383	92.195
99	32.483	92.215	91.548	92.309	92.099
100	32.817	92.204	91.494	92.244	92.034
101	33.150	92.152	91.408	92.179	91.949
102	33.483	92.087	91.343	92.125	91.895
103	33.817	92.011	91.267	92.062	91.830
104	34.150	91.980	91.235	92.009	91.767
105	34.483	91.998	91.177	91.928	91.729
106	34.817	91.879	91.080	91.865	91.720
107	35.150	91.848	91.018	91.823	91.655
108	35.483	91.798	90.934	91.751	91.594
109	35.817	91.740	90.876	91.704	91.547
110	36.150	91.659	90.827	91.632	91.498
111	36.483	91.637	90.784	91.578	91.433
112	36.817	91.606	90.710	91.525	91.370
113	37.150	91.518	90.645	91.482	91.325
114	37.483	91.494	90.575	91.426	91.278

ILRT Data

Sample Number	TEST TIME	RTD 17 DEG F	RTD 18 DEG F	RTD 19 DEG F	RTD 20 DEG F
89	29.150	92.405	92.992	91.785	Deleted
90	29.483	92.313	92.889	91.724	Deleted
91	29.817	92.227	92.815	91.670	Deleted
92	30.150	92.162	92.739	91.616	Deleted
93	30.483	92.088	92.665	91.574	Deleted
94	30.817	91.992	92.580	91.540	Deleted
95	31.150	91.938	92.504	91.498	Deleted
96	31.483	91.852	92.450	91.455	Deleted
97	31.817	91.807	92.365	91.413	Deleted
98	32.150	91.744	92.300	91.370	Deleted
99	32.483	91.691	92.257	91.327	Deleted
100	32.817	91.614	92.194	91.262	Deleted
101	33.150	91.540	92.107	91.231	Deleted
102	33.483	91.432	92.044	91.197	Deleted
103	33.817	91.401	92.000	91.166	Deleted
104	34.150	91.324	91.946	91.135	Deleted
105	34.483	91.288	91.890	91.108	Deleted
106	34.817	91.223	91.814	91.034	Deleted
107	35.150	91.160	91.751	90.980	Deleted
108	35.483	91.077	91.690	90.951	Deleted
109	35.817	91.030	91.643	90.915	Deleted
110	36.150	90.981	91.560	90.877	Deleted
111	36.483	90.884	91.507	90.843	Deleted
112	36.817	90.830	91.444	90.812	Deleted
113	37.150	90.819	91.390	90.781	Deleted
114	37.483	90.763	91.343	90.787	Deleted
115	37.817	90.691	91.303	90.727	Deleted

ILRT Data

Sample Number	TEST TIME	RTD 21 DEG F	RTD 22 DEG F	RTD 23 DEG F	RTD 24 DEG F
89	29.150	90.576	91.065	91.591	91.458
90	29.483	90.522	91.011	91.559	91.405
91	29.817	90.457	90.968	91.517	91.373
92	30.150	90.394	90.926	91.483	91.308
93	30.483	90.329	90.883	91.452	91.277
94	30.817	90.287	90.841	91.398	91.212
95	31.150	90.222	90.798	91.356	91.149
96	31.483	90.159	90.765	91.324	91.115
97	31.817	90.105	90.722	91.302	91.061
98	32.150	90.029	91.011	91.226	90.998
99	32.483	89.962	91.083	91.127	90.972
100	32.817	89.890	91.076	91.055	90.922
101	33.150	89.793	91.107	90.959	90.859
102	33.483	89.708	91.096	90.894	90.848
103	33.817	89.515	90.980	90.874	90.826
104	34.150	89.435	90.953	90.870	90.790
105	34.483	89.385	90.926	90.841	90.718
106	34.817	89.257	90.872	90.789	90.687
107	35.150	89.204	90.798	90.744	90.622
108	35.483	89.215	90.765	90.713	90.579
109	35.817	89.183	90.776	90.670	90.516
110	36.150	89.150	90.722	90.639	90.516
111	36.483	89.076	90.648	90.585	90.505
112	36.817	89.033	90.606	90.552	90.44
113	37.150	89.011	90.561	90.520	90.301
114	37.483	88.979	90.510	90.498	90.278
115	37.817	88.914	90.476	90.478	90.247

ILRT Data

Sample Number	TEST TIME	RTD 25 DEG F	RTD 26 DEG F	RTD 27 DEG F	RTD 28 DEG F
89	29.150	92.864	91.205	90.782	90.918
90	29.483	92.788	91.163	90.719	90.875
91	29.817	92.692	91.109	90.676	90.822
92	30.150	92.618	91.066	90.612	90.779
93	30.483	92.542	91.035	90.538	90.746
94	30.817	92.468	90.992	90.493	90.714
95	31.150	92.392	90.947	90.430	90.672
96	31.483	92.318	90.904	90.334	90.618
97	31.817	92.242	90.873	90.291	90.533
98	32.150	92.179	90.830	90.108	90.511
99	32.483	92.098	90.803	90.061	90.486
100	32.817	92.040	90.765	89.553	90.392
101	33.150	91.975	90.722	89.349	90.372
102	33.483	91.899	90.700	89.188	90.349
103	33.817	91.836	90.657	89.081	90.287
104	34.150	91.778	90.633	89.013	90.260
105	34.483	91.718	90.594	88.899	90.199
106	34.817	91.655	90.561	88.814	90.190
107	35.150	91.601	90.541	88.642	90.137
108	35.483	91.536	90.507	88.579	90.094
109	35.817	91.471	90.475	88.472	90.072
110	36.150	91.418	90.444	88.407	90.061
111	36.483	91.355	90.422	88.364	90.029
112	36.817	91.301	90.390	88.299	89.987
113	37.150	91.259	90.359	88.248	89.975
114	37.483	91.194	90.314	88.118	89.922
115	37.817	91.151	90.305	88.056	89.890

ILRT Data

Sample Number	TEST TIME	RTD 29 DEG F	RTD 30 DEG F	RTD 31 DEG F	RTD 32 DEG F
89	29.150	92.873	92.725	91.573	93.082
90	29.483	92.788	92.651	91.489	93.019
91	29.817	92.702	92.553	91.381	92.922
92	30.150	92.649	92.467	91.328	92.846
93	30.483	92.541	92.393	91.220	92.750
94	30.817	92.456	92.317	91.135	92.664
95	31.150	92.359	92.243	91.039	92.590
96	31.483	92.294	92.189	90.912	92.503
97	31.817	92.220	92.104	90.889	92.406
98	32.150	92.124	92.039	90.804	92.290
99	32.483	92.066	91.972	90.735	92.296
100	32.817	91.985	91.889	90.590	92.225
101	33.150	91.920	91.835	90.548	92.171
102	33.483	91.846	91.761	90.516	92.097
103	33.817	91.781	91.696	90.451	92.021
104	34.150	91.723	91.637	90.331	91.953
105	34.483	91.631	91.557	90.259	91.882
106	34.817	91.566	91.503	90.185	91.817
107	35.150	91.503	91.449	90.121	91.754
108	35.483	91.416	91.375	90.036	91.700
109	35.817	91.353	91.332	89.993	91.646
110	36.150	91.277	91.267	89.917	91.570
111	36.483	91.223	91.213	89.864	91.527
112	36.817	91.169	91.148	89.801	91.473
113	37.150	91.095	91.106	89.725	91.431
114	37.483	91.030	91.052	89.662	91.368
115	37.817	90.988	90.998	89.555	91.323

ILRT Data

Sample Number	TEST TIME	RTD 33 DEG F	RTD 34 DEG F	RTD 35 DEG F	RTD 36 DEG F
89	29.150	92.958	93.096	91.955	92.762
90	29.483	92.873	92.999	91.859	92.688
91	29.817	92.797	92.925	91.794	92.603
92	30.150	92.712	92.840	91.709	92.526
93	30.483	92.615	92.764	91.601	92.452
94	30.817	92.519	92.678	91.525	92.365
95	31.150	92.465	92.613	91.235	92.302
96	31.483	92.411	92.528	91.173	92.217
97	31.817	92.400	92.463	91.108	92.141
98	32.150	92.292	92.389	91.043	92.087
99	32.483	92.203	92.330	90.995	92.020
100	32.817	92.133	92.258	90.892	91.937
101	33.150	92.091	92.195	90.829	91.874
102	33.483	92.015	92.141	90.776	91.809
103	33.817	91.941	92.065	90.722	91.744
104	34.150	91.947	92.009	90.643	91.676
105	34.483	91.737	91.948	90.603	91.616
106	34.817	91.737	91.894	90.540	91.551
107	35.150	91.714	91.829	90.464	91.486
108	35.483	91.768	91.766	90.410	91.434
109	35.817	91.683	91.712	90.356	91.380
110	36.150	91.575	91.659	90.294	91.304
111	36.483	91.521	91.593	90.271	91.273
112	36.817	91.459	91.540	90.217	91.208
113	37.150	91.383	91.497	90.163	91.154
114	37.483	91.318	91.443	90.089	91.100

ILRT Data

Sample Number	TEST TIME	RTD 37 DEG F	RTD 38 DEG F	RTD 39 DEG F	RTD 40 DEG F
89	29.150	92.901	Deleted	91.361	92.632
90	29.483	92.813	Deleted	91.265	92.54
91	29.817	92.717	Deleted	91.189	92.464
92	30.150	92.632	Deleted	91.104	92.368
93	30.483	92.567	Deleted	91.039	92.305
94	30.817	92.493	Deleted	90.953	92.229
95	31.150	92.428	Deleted	90.879	92.164
96	31.483	92.343	Deleted	90.814	92.079
97	31.817	92.278	Deleted	90.738	92.014
98	32.150	92.204	Deleted	90.653	91.951
99	32.483	92.168	Deleted	90.595	91.863
100	32.817	92.085	Deleted	90.525	91.801
101	33.150	92.022	Deleted	90.460	91.724
102	33.483	91.957	Deleted	90.396	91.662
103	33.817	91.892	Deleted	90.322	91.617
104	34.150	91.836	Deleted	90.274	91.565
105	34.483	91.776	Deleted	90.203	91.518
106	34.817	91.722	Deleted	90.140	91.442
107	35.150	91.668	Deleted	90.086	91.377
108	35.483	91.614	Deleted	90.021	91.308
109	35.817	91.561	Deleted	89.979	91.261
110	36.150	91.507	Deleted	89.894	91.200
111	36.483	91.453	Deleted	89.840	91.135
112	36.817	91.399	Deleted	89.818	91.081
113	37.150	91.357	Deleted	89.744	91.027
114	37.483	91.314	Deleted	89.690	90.992
115	37.817	91.240	Deleted	89.658	90.900

ILRT Data

Sample Number	TEST TIME	RHD 1 % RH	RHD 2 % RH	RHD 3 % RH	RHD 4 % RH
89	29.150	55.91	67.03	65.25	81.60
90	29.483	56.11	67.18	65.45	81.38
91	29.817	56.29	67.34	65.67	81.58
92	30.150	56.46	67.51	65.90	81.62
93	30.483	56.61	67.65	66.11	81.51
94	30.817	56.81	67.82	66.31	81.38
95	31.150	56.97	67.97	66.53	81.48
96	31.483	57.21	68.11	66.73	81.27
97	31.817	57.42	68.27	66.91	81.24
98	32.150	57.73	68.42	67.11	81.42
99	32.483	57.90	68.56	67.31	81.24
100	32.817	58.18	68.71	67.52	81.11
101	33.150	58.44	68.86	67.73	81.36
102	33.483	58.63	69.03	67.93	81.26
103	33.817	58.92	69.16	68.12	81.15
104	34.150	59.14	69.29	68.37	81.28
105	34.483	59.32	69.43	68.58	81.10
106	34.817	59.56	69.57	68.74	81.12
107	35.150	59.81	69.71	68.95	81.09
108	35.483	59.99	69.83	69.17	81.00
109	35.817	60.23	69.97	69.36	81.04
110	36.150	60.46	70.10	69.53	81.02
111	36.483	60.62	70.21	69.67	81.06
112	36.817	60.85	70.35	69.90	81.07
113	37.150	61.06	70.48	70.06	80.68
114	37.483	61.27	70.60	70.24	80.92
115	37.817	61.48	70.73	70.35	80.78

ILRT Data

Sample Number	TEST TIME	RHD 5 % RH	RHD 6 % RH	RHD 7 % RH	RHD 8 % RH
89	29.150	85.13	72.85	79.85	100.85
90	29.483	85.08	72.82	79.89	101.47
91	29.817	85.05	73.34	79.79	101.50
92	30.150	85.04	73.54	79.89	101.68
93	30.483	84.99	73.57	79.78	101.08
94	30.817	84.95	74.75	79.58	102.29
95	31.150	84.99	74.52	79.61	102.25
96	31.483	84.92	75.20	79.35	101.35
97	31.817	84.93	76.14	81.98	102.36
98	32.150	84.92	77.06	79.88	102.16
99	32.483	84.80	77.07	79.67	102.19
100	32.817	84.75	76.80	79.43	101.93
101	33.150	84.77	77.37	79.59	102.77
102	33.483	84.77	76.71	81.08	102.02
103	33.817	84.62	77.93	80.29	101.88
104	34.150	84.61	78.30	79.80	102.00
105	34.483	84.58	78.65	79.56	102.76
106	34.817	84.47	78.98	79.50	103.18
107	35.150	84.50	79.21	79.44	102.44
108	35.483	84.37	79.40	79.49	102.72
109	35.817	84.33	78.97	79.30	102.20
110	36.150	84.25	79.72	79.36	102.22
111	36.483	84.17	79.45	79.18	102.35
112	36.817	84.11	79.85	79.22	102.15
113	37.150	84.00	79.82	79.29	102.41
114	37.483	84.03	79.90	79.17	102.39
115	37.817	83.75	79.80	79.06	102.80

ILRT Data

Sample Number	TEST TIME	RHD 9 % RH	RHD 10 % RH	CONT. PRESSURE	VAPOR PRESSURE
89	29.150	100.33	98.86	57.160	0.6233
90	29.483	100.51	98.96	57.154	0.6228
91	29.817	100.76	99.11	57.147	0.6226
92	30.150	100.91	99.42	57.141	0.6224
93	30.483	101.03	99.09	57.135	0.6203
94	30.817	101.17	99.63	57.128	0.6217
95	31.150	101.32	99.63	57.122	0.6206
96	31.483	101.41	99.94	57.116	0.6191
97	31.817	101.53	100.04	57.110	0.6219
98	32.150	101.66	100.14	57.105	0.6201
99	32.483	101.79	99.53	57.099	0.6186
100	32.817	101.82	99.68	57.094	0.6171
101	33.150	102.02	100.42	57.088	0.6189
102	33.483	102.07	100.56	57.083	0.6180
103	33.817	102.11	100.78	57.077	0.6174
104	34.150	102.22	100.65	57.072	0.6168
105	34.483	102.24	100.98	57.067	0.6171
106	34.817	102.31	100.91	57.062	0.6169
107	35.150	102.41	100.99	57.057	0.6157
108	35.483	102.44	101.00	57.052	0.6153
109	35.817	102.50	101.10	57.047	0.6140
110	36.150	102.55	100.87	57.042	0.6134
111	36.483	102.57	101.17	57.038	0.6129
112	36.817	102.58	101.35	57.033	0.6125
113	37.150	102.62	101.41	57.029	0.6119
114	37.483	102.71	101.43	57.024	0.6116
115	37.817	102.66	101.24	57.020	0.6105

ILRT Data

Sample Number	TEST TIME	AVERAGE TEMP	AIR MASS	LEAK SIM %/DAY	LEAK FIT %/DAY	UCL %/DAY
89	29.150	91.010	692744			
90	29.483	90.945	692757	-0.134		
91	29.817	90.888	692747	-0.015		
92	30.150	90.830	692747	-0.011	0.009	0.467
93	30.483	90.777	692767	-0.059	-0.020	0.282
94	30.817	90.720	692735	0.019	0.013	0.204
95	31.150	90.662	692750	-0.009	0.014	0.168
96	31.483	90.604	692766	-0.033	0.002	0.145
97	31.817	90.554	692722	0.028	0.020	0.144
98	32.150	90.497	692754	-0.012	0.017	0.132
99	32.483	90.456	692750	-0.006	0.016	0.123
100	32.817	90.392	692789	-0.042	0.003	0.112
101	33.150	90.339	692760	-0.014	0.002	0.104
102	33.483	90.291	692769	-0.020	0.000	0.096
103	33.817	90.239	692768	-0.018	-0.002	0.090
104	34.150	90.197	692767	-0.016	-0.003	0.085
105	34.483	90.153	692758	-0.009	-0.002	0.081
106	34.817	90.103	692763	-0.011	-0.002	0.078
107	35.150	90.055	692775	-0.018	-0.003	0.074
108	35.483	90.011	692775	-0.017	-0.004	0.070
109	35.817	89.974	692776	-0.017	-0.005	0.067
110	36.150	89.927	692781	-0.018	-0.006	0.064
111	36.483	89.887	692789	-0.021	-0.008	0.061
112	36.817	89.848	692780	-0.016	-0.008	0.059
113	37.150	89.807	692791	-0.020	-0.009	0.056
114	37.483	89.768	692783	-0.016	-0.009	0.054
115	37.817	89.724	692802	-0.023	-0.010	0.052

CONTAINMENT INTEGRATED LEAKAGE RATE TEST

LEAKAGE RATE IS MEASURED USING THE ABSOLUTE METHOD AND IS COMPUTED USING THE TOTAL TIME METHOD IN STRICT ACCORDANCE WITH TOPICAL REPORT BN-TOP-1 (REV 1)

TEST PERIOD STARTED AT 15:20 HOURS ON 6/16/92
TEST CONDUCTED FOR 8.67 HOURS

FREE SPACE VOLUME OF CONTAINMENT IS 2500000 CU FT
CONTAINMENT WAS PRESSURIZED TO 57.16 PSIA

FITTED TOTAL TIME ILRT LEAKAGE RATE	Lam	=	-0.010 % /DAY
UPPER LIMIT OF 95% CONFIDENCE LEVEL	UCL	=	0.052 % /DAY
CONTAINMENT DESIGN LEAKAGE RATE	La	=	0.500 % /DAY
ILRT ACCEPTANCE CRITERIA	75% La	=	0.375 % /DAY

BN-TOP REDUCED DURATION ILRT TERMINATION CRITERIA

-THE TREND OF THE TOTAL TIME CALCULATED LEAKAGE RATE SHALL INDICATE THAT THE MAGNITUDE OF THE LEAKAGE RATE IS TENDING TO STABILIZE AT A VALUE LESS THAN OR EQUAL TO 75% OF La.

La = 0.500 % /DAY
75% La = 0.375 % /DAY
Lam = -0.010 % /DAY with a Negative Skew

-AT THE END OF THE ILRT THE UPPER LIMIT OF THE 95% CONFIDENCE LEVEL SHALL BE LESS THAN OR EQUAL TO 75% OF La.

UCL = 0.052 % /DAY

-THE MEAN OF THE MEASURED LEAKAGE RATES OVER THE LAST 5 HOURS OR 20 DATA SETS, WHICHEVER PROVIDES THE MOST POINTS, SHALL BE LESS THAN OR EQUAL TO 75% OF La.

MEAN OF SIMPLE LEAKAGE FOR SAMPLES = -0.016 % /DAY

DESCRIPTION OF VARIABLES

AVE TEMP - CONTAINMENT MEAN TEMPERATURE CALCULATED FROM VOLUMETRICALLY WEIGHTED RTD SENSOR INDICATIONS.

PRESSURE - PRIMARY CONTAINMENT PRESSURE INDICATION.

VAPOR PRES - CONTAINMENT VAPOR PRESSURE CALCULATED FROM VOLUMETRICALLY WEIGHTED HUMIDITY/DEWPOINT SENSOR INDICATIONS.

LEAK SIM - SIMPLE TOTAL TIME MEASURED LEAKAGE RATE.

LEAK FIT - LEAKAGE RATE CALCULATED FROM FIRST ORDER REGRESSION OF SIMPLE TOTAL TIME LEAKAGE RATE DATA.

95% UCL - UPPER LIMIT OF THE 95% CONFIDENCE LEVEL OF FITTED LEAKAGE RATE DATA.

AIR MASS - CONTAINMENT AIR MASS.

NOTES FOR TABULAR DATA -

1. TABLE VALUES OF ZERO SIGNIFY THE DATA IS NOT APPLICABLE TO THE CALCULATION.
2. "DELETED" SIGNIFIES THE SENSOR WAS DELETED.

SENSOR VOLUME FRACTIONS

TEMPERATURE SENSORS

1 to 5	0.026708	0.026708	0.026708	0.026708	0.026708
6 to 10	0.026708	0.026708	0.026708	0.026785	0.026785
11 to 15	0.026785	0.026785	0.026785	0.026785	0.026785
16 to 20	0.026785	0.026785	0.026785	0.026708	0.000000
21 to 25	0.026708	0.026708	0.026708	0.026708	0.026708
26 to 30	0.026708	0.026708	0.026708	0.020144	0.020144
31 to 35	0.020144	0.020144	0.020144	0.020144	0.020144
36 to 40	0.020144	0.020144	0.000000	0.048409	0.048409

HUMIDITY/DP SENSORS

1 to 5	0.073335	0.073335	0.073335	0.090064	0.090064
6 to 10	0.090064	0.090064	0.139913	0.139913	0.139913

NOTE: VALUE OF ZERO INDICATES A DELETED SENSOR.

ILRT Containment Absolute Pressure

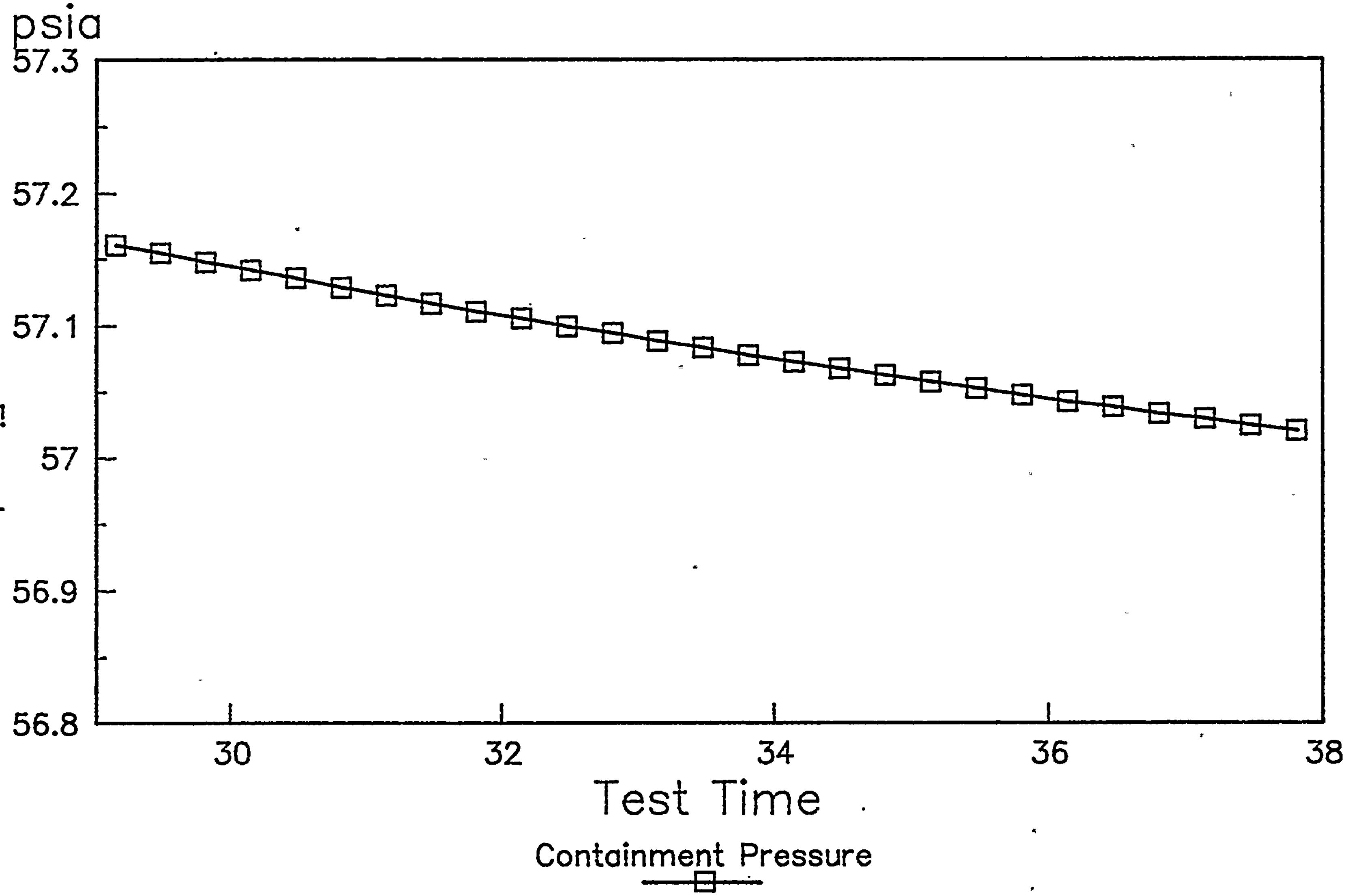


Figure L 86

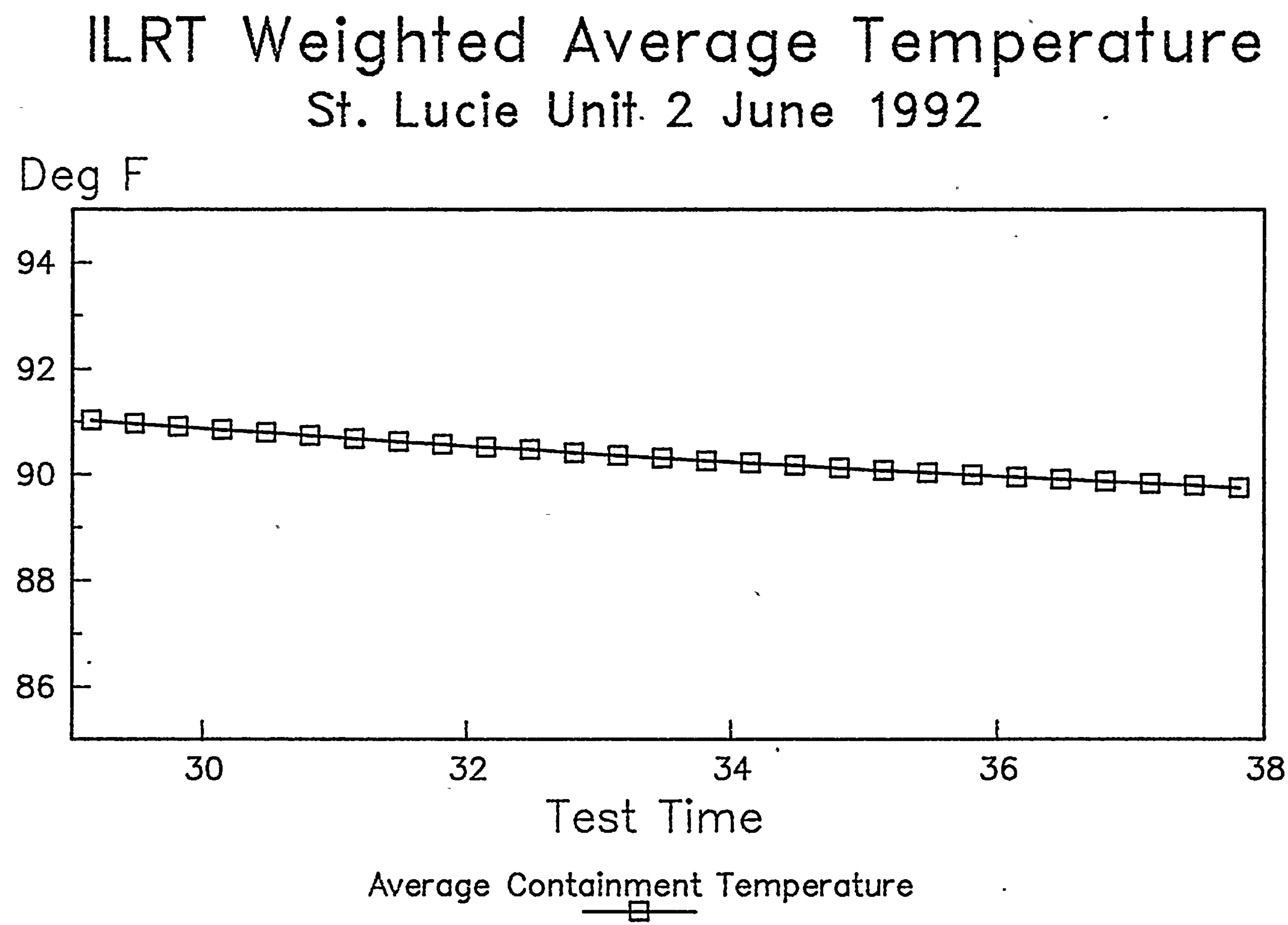

ILRT Weighted Average Temperature
St. Lucie Unit 2 June 1992
Deg F
94
92
90
88
86
30
32
34
36
38
Test Time
Average Containment Temperature

Figure M
87

ILRT Weighted Average Vapor Pressure

St. Lucie Unit 2 June 1992

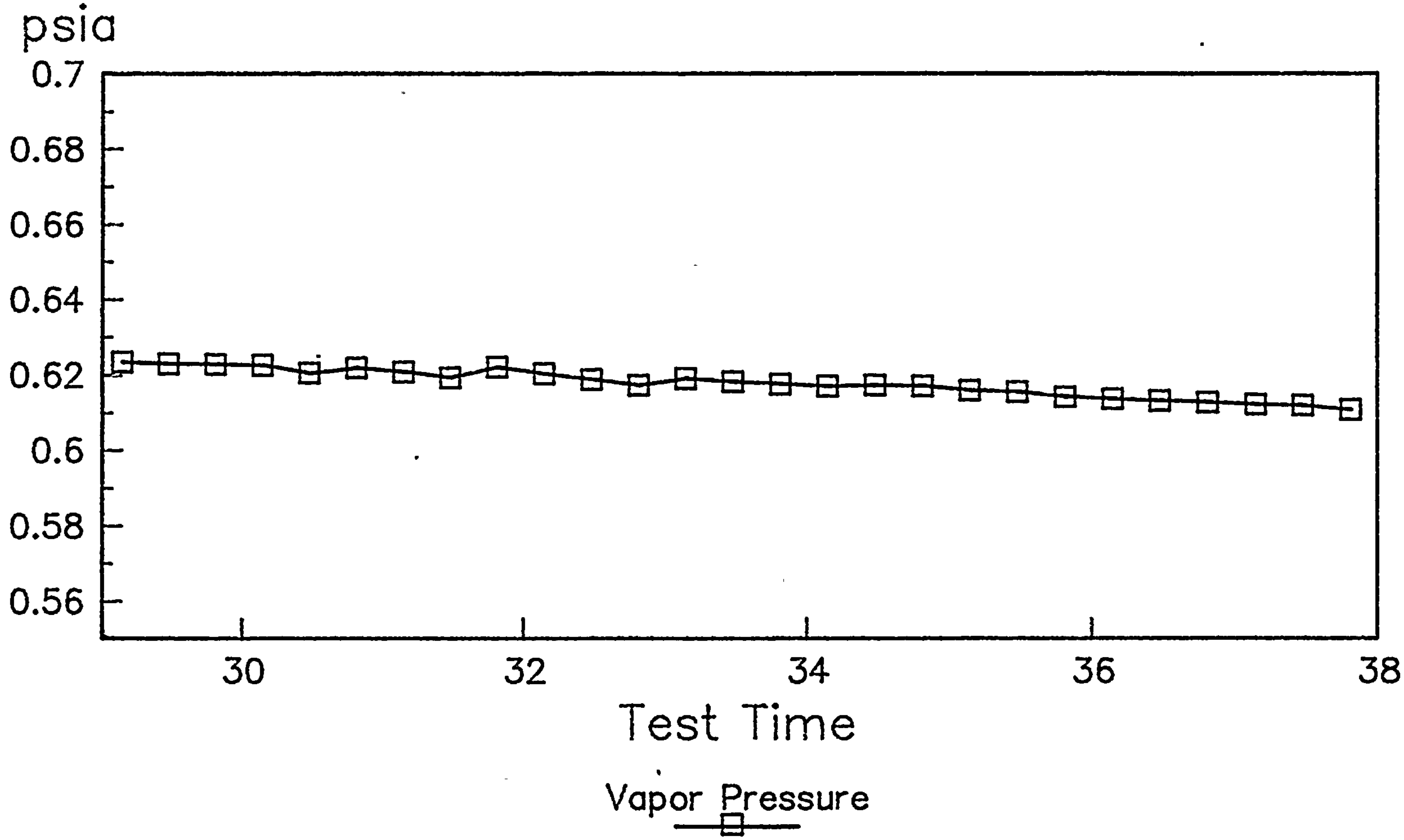


Figure N
88

ILRT Calculated Air Mass

St. Lucie Unit 2 June 1992

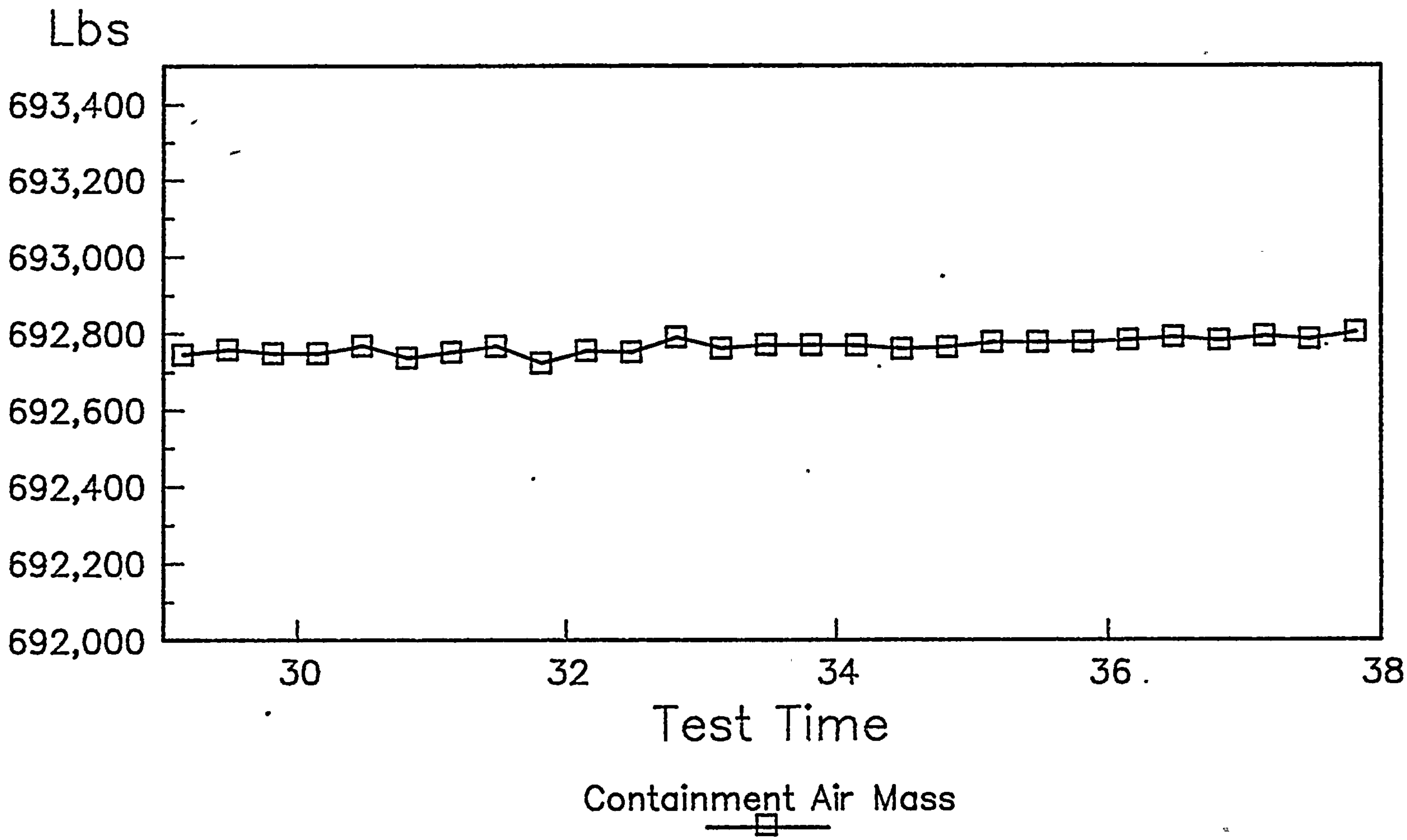


Figure O

ILRT Bn-Top Rates Relative To limits

St. Lucie Unit 2 June 1992

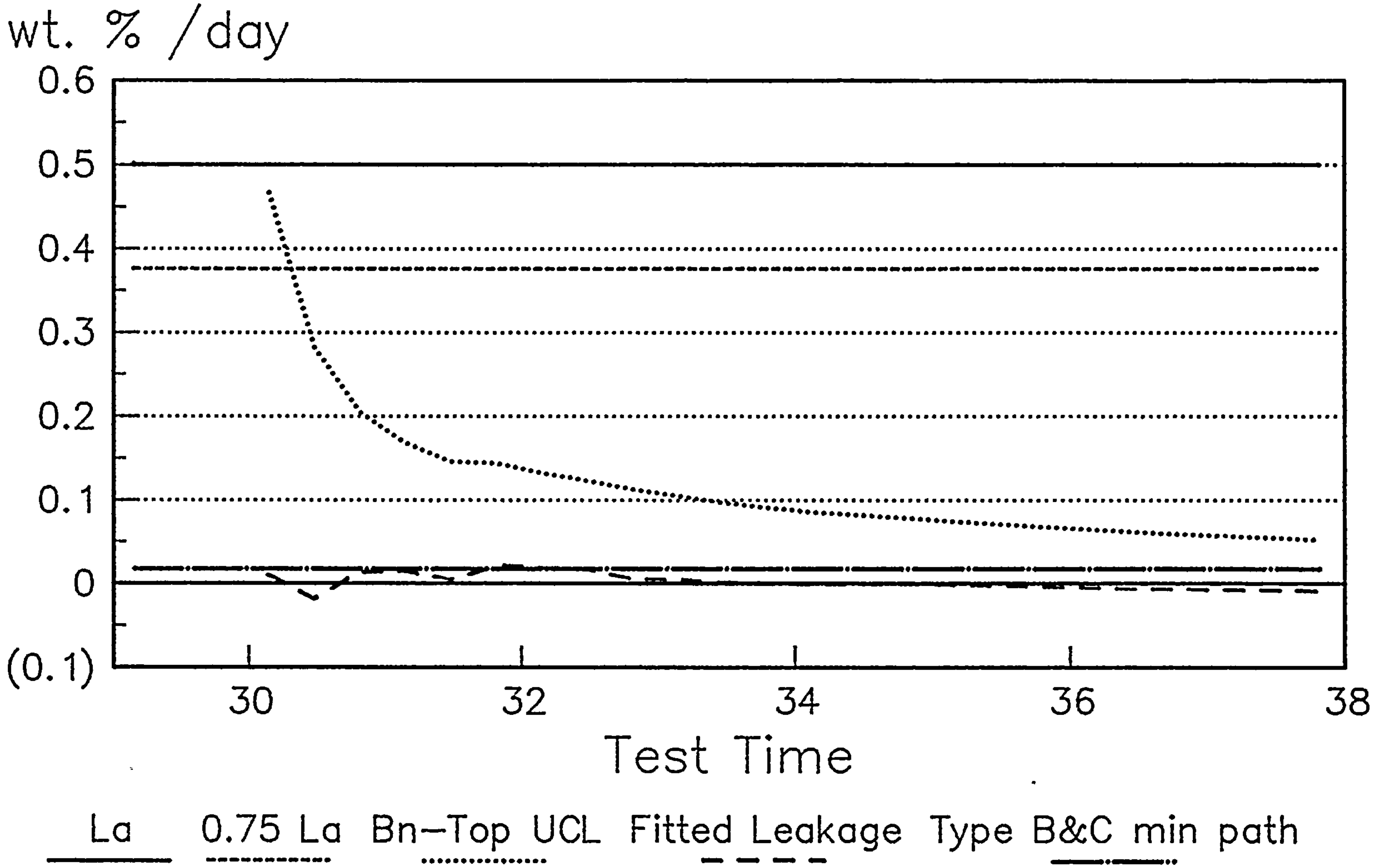
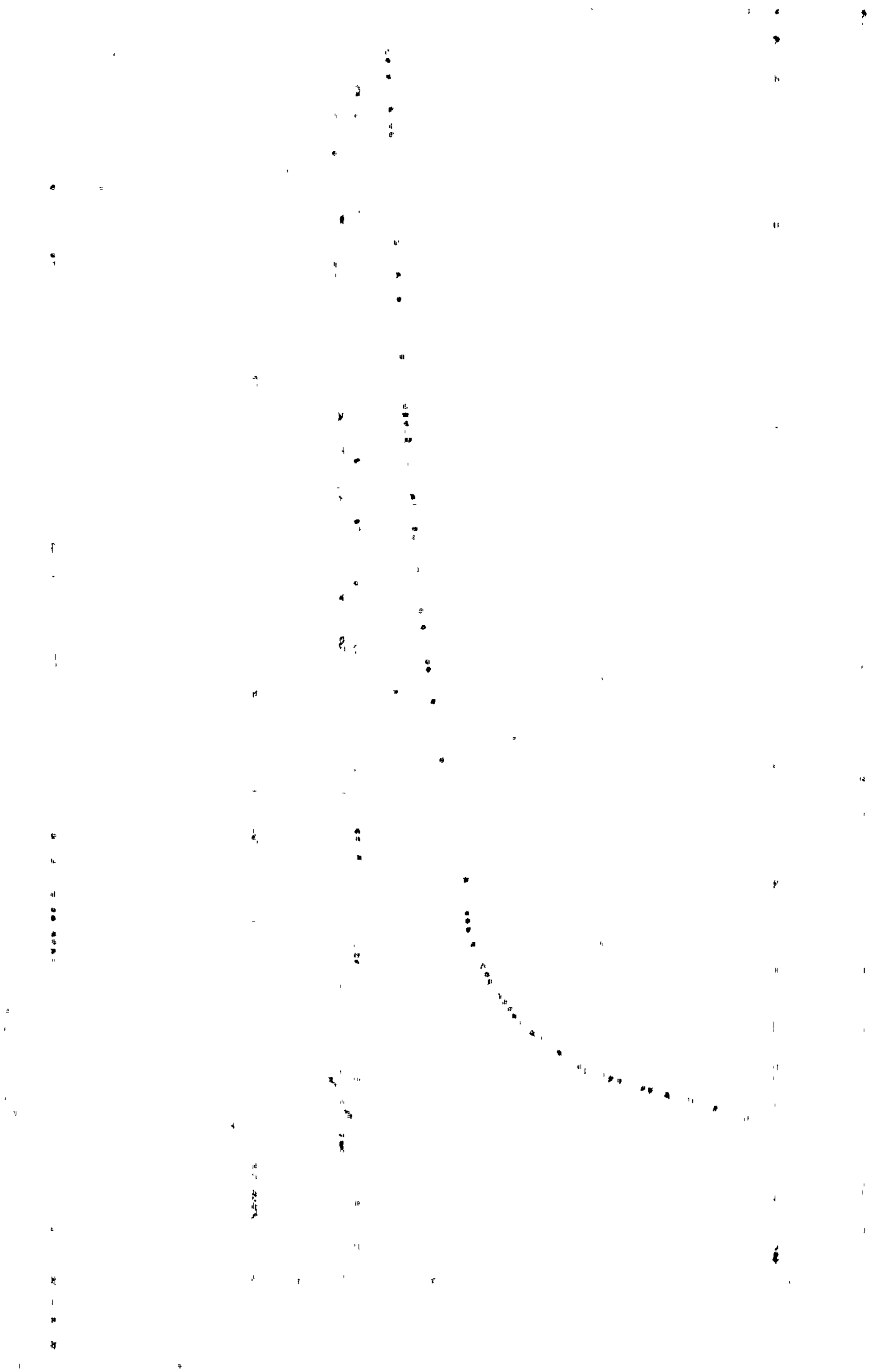


Figure P 90

Note Type B & C expected Minimum path leakage



Local Sensor Deviation Effect on Air Mass Calculation

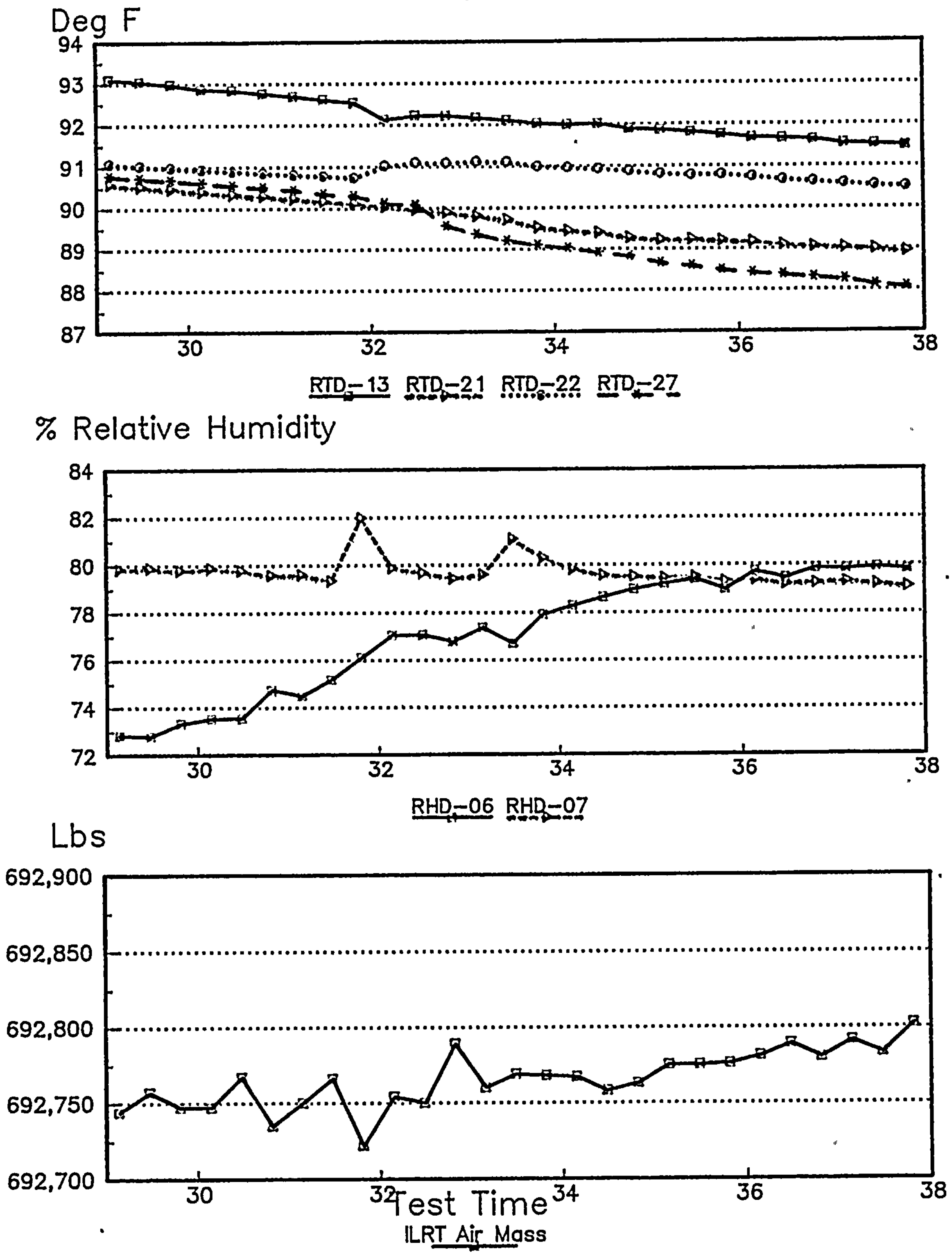
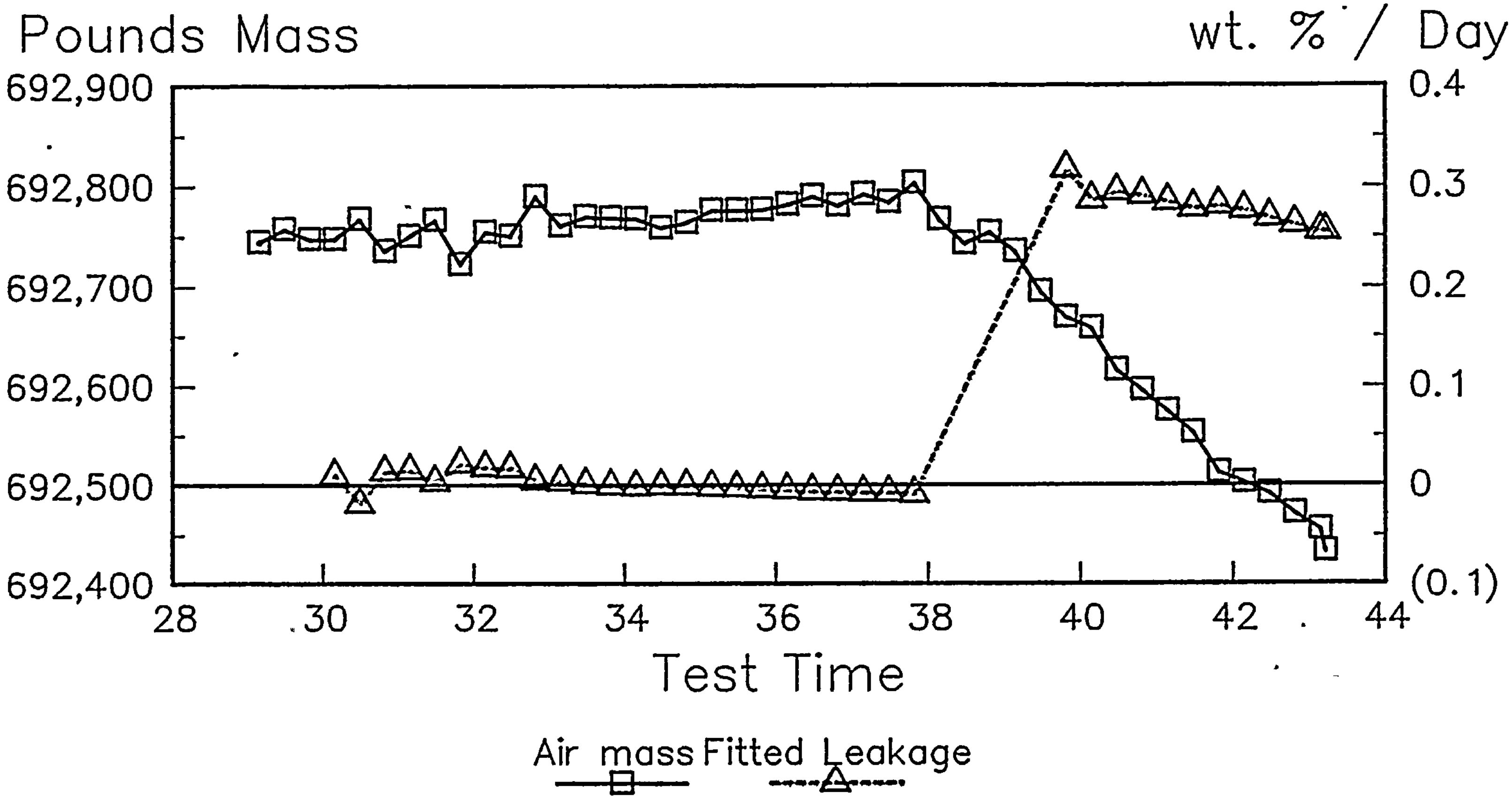


Figure Q

ILRT & CLRT

Air mass and Fitted Leakage Rates



Note rapid change in calculated mass and leakage rate when known leak of 17.79 SSCM (0.264 wt.% / Day) added at hour 37.9

Figure R 92

CLRT DATA

CLRT Data

Sample Number	TEST TIME	RTD 1 DEG F	RTD 2 DEG F	RTD 3 DEG F	RTD 4 DEG F
118	38.8170	86.678	87.171	86.531	85.965
119	39.150	86.685	87.167	86.527	85.960
120	39.483	86.674	87.167	86.527	85.971
121	39.817	86.674	87.155	86.527	85.971
122	40.150	86.656	87.151	86.509	85.953
123	40.483	86.667	87.140	86.509	85.953
124	40.817	86.674	87.147	86.515	85.960
125	41.150	86.656	87.129	86.520	85.953
126	41.483	86.656	87.129	86.520	85.953
127	41.817	86.656	87.129	86.520	85.953
128	42.150	86.654	87.124	86.515	85.949
129	42.483	86.654	87.124	86.504	85.949
130	42.817	86.636	87.106	86.509	85.942
131	43.150	86.631	87.113	86.515	85.949
132	43.217	86.642	87.113	86.504	85.949

Sample Number	TEST TIME	RTD 5 DEG F	RTD 6 DEG F	RTD 7 DEG F	RTD 8 DEG F
118	38.817	85.870	86.371	86.515	85.921
119	39.150	85.877	86.378	86.510	85.939
120	39.483	85.866	86.373	86.510	85.929
121	39.817	85.877	86.378	86.510	85.928
122	40.150	85.859	86.371	86.492	85.921
123	40.483	85.848	86.371	86.492	85.921
124	40.817	85.866	86.378	86.499	85.917
125	41.150	85.859	86.360	86.492	85.910
126	41.483	85.828	86.360	86.492	85.910
127	41.817	85.848	86.360	86.481	85.910
128	42.150	85.855	86.367	86.488	85.917
129	42.483	85.855	86.356	86.479	85.917
130	42.817	85.848	86.349	86.472	85.899
131	43.150	85.846	86.356	86.488	85.917
132	43.217	85.846	86.356	86.479	85.906

CLRT Data

Sample Number	TEST TIME	RTD 9 DEG F	RTD 10 DEG F	RTD 11 DEG F	RTD 12 DEG F
118	38.817	91.429	90.776	91.268	90.867
119	39.150	91.370	90.740	91.221	90.820
120	39.483	91.317	90.686	91.179	90.763
121	39.817	91.285	90.643	91.136	90.714
122	40.150	91.236	90.605	91.087	90.674
123	40.483	91.193	90.679	91.033	90.631
124	40.817	91.146	90.675	90.998	90.573
125	41.150	91.097	90.540	90.948	90.535
126	41.483	91.063	90.497	90.904	90.504
127	41.817	91.010	90.562	90.872	90.461
128	42.150	90.974	90.439	90.837	90.423
129	42.483	90.931	90.396	90.794	90.371
130	42.817	90.882	90.358	90.754	90.320
131	43.150	90.846	90.320	90.718	90.284
132	43.217	90.835	90.320	90.718	90.284

Sample Number	TEST TIME	RTD 13 DEG F	RTD 14 DEG F	RTD 15 DEG F	RTD 16 DEG F
118	38.817	91.283	90.321	91.215	91.059
119	39.150	91.267	90.265	91.168	91.012
120	39.483	91.267	90.200	91.115	91.035
121	39.817	91.247	90.169	91.072	90.935
122	40.150	91.198	90.119	91.012	90.940
123	40.483	91.155	90.054	90.969	90.908
124	40.817	91.108	89.931	90.911	90.893
125	41.150	91.059	89.924	90.882	90.855
126	41.483	90.963	89.904	90.828	90.801
127	41.817	90.929	89.861	90.797	90.770
128	42.150	90.851	89.834	90.761	90.743
129	42.483	90.808	89.791	90.707	90.700
130	42.817	90.759	89.688	90.669	90.608
131	43.150	90.712	89.641	90.599	90.572
132	43.217	90.701	89.641	90.633	90.572

CLRT Data

Sample Number	TEST TIME	RTD 17 DEG F	RTD 18 DEG F	RTD 19 DEG F	RTD 20 DEG F
118	38.817	90.594	91.110	90.566	Deleted
119	39.150	90.547	91.063	90.550	Deleted
120	39.483	90.504	91.021	90.513	Deleted
121	39.817	90.462	90.967	90.454	Deleted
122	40.150	90.433	90.906	90.404	Deleted
123	40.483	90.433	90.864	90.373	Deleted
124	40.817	90.354	90.817	90.337	Deleted
125	41.150	90.325	90.768	90.297	Deleted
126	41.483	90.271	90.725	90.297	Deleted
127	41.817	90.239	90.705	90.254	Deleted
128	42.150	90.192	90.678	90.207	Deleted
129	42.483	90.149	90.635	90.176	Deleted
130	42.817	90.154	90.586	90.095	Deleted
131	43.150	90.118	90.562	90.079	Deleted
132	43.217	90.127	90.55	90.068	Deleted

Sample Number	TEST TIME	RTD 21 DEG F	RTD 22 DEG F	RTD 23 DEG F	RTD 24 DEG F
118	38.817	88.849	90.369	90.371	89.946
119	39.150	88.840	90.326	90.339	89.818
120	39.483	88.813	90.295	90.305	89.742
121	39.817	88.814	90.279	90.281	89.675
122	40.150	88.796	90.252	90.252	89.626
123	40.483	88.764	90.230	90.221	89.583
124	40.817	88.764	90.198	90.189	89.518
125	41.150	88.782	90.174	90.162	89.482
126	41.483	88.753	90.145	90.124	89.453
127	41.817	88.753	90.122	90.104	89.433
128	42.150	88.771	90.066	90.100	89.417
129	42.483	88.722	90.049	90.059	89.390
130	42.817	88.760	90.044	90.035	89.386
131	43.150	88.749	90.013	90.003	89.352
132	43.217	88.749	90.013	90.003	89.352

CLRT Data

Sample Number	TEST TIME	RTD 25 DEG F	RTD 26 DEG F	RTD 27 DEG F	RTD 28 DEG F
118	38.817	90.979	90.208	87.906	89.794
119	39.150	90.927	90.175	87.830	89.772
120	39.483	90.882	90.154	87.797	89.772
121	39.817	90.847	90.127	87.762	89.747
122	40.150	90.786	90.100	87.745	89.729
123	40.483	90.744	90.067	87.702	89.687
124	40.817	90.690	90.035	87.617	89.655
125	41.150	90.643	90.020	87.601	89.662
126	41.483	90.605	89.981	87.521	89.602
127	41.817	90.562	89.961	87.476	89.579
128	42.150	90.526	89.934	87.463	89.575
129	42.483	90.477	89.907	87.425	89.548
130	42.817	90.450	89.880	87.398	89.521
131	43.150	90.408	89.849	87.355	89.501
132	43.217	90.397	89.849	87.344	89.501

Sample Number	TEST TIME	RTD 29 DEG F	RTD 30 DEG F	RTD 31 DEG F	RTD 32 DEG F
118	38.817	90.826	90.839	89.405	91.153
119	39.150	90.775	90.796	89.330	91.056
120	39.483	90.721	90.742	89.287	91.003
121	39.817	90.663	90.704	89.229	90.978
122	40.150	90.602	90.646	89.191	90.917
123	40.483	90.537	90.601	89.160	90.863
124	40.817	90.494	90.559	89.128	90.863
125	41.150	90.459	90.523	89.082	90.794
126	41.483	90.409	90.473	89.041	90.767
127	41.817	90.344	90.419	89.021	90.702
128	42.150	90.320	90.384	88.974	90.677
129	42.483	90.281	90.334	88.945	90.617
130	42.817	90.223	90.298	88.813	90.592
131	43.150	90.181	90.265	88.706	90.547
132	43.217	90.201	90.256	88.695	90.538

CLRT Data

Sample Number	TEST TIME	RTD 33 DEG F	RTD 34 DEG F	RTD 35 DEG F	RTD 36 DEG F
118	38.817	91.297	91.272	89.832	90.898
119	39.150	91.266	91.207	89.778	90.833
120	39.483	91.212	91.153	89.639	90.802
121	39.817	91.111	91.129	89.580	90.755
122	40.150	91.019	91.057	89.520	90.705
123	40.483	90.955	91.034	89.435	90.672
124	40.817	90.890	90.992	89.423	90.618
125	41.150	90.854	90.944	89.356	90.571
126	41.483	90.901	90.895	89.276	90.533
127	41.817	90.836	90.852	89.222	90.501
128	42.150	90.769	90.805	89.152	90.454
129	42.483	90.719	90.767	89.029	90.414
130	42.817	90.692	90.731	89.002	90.378
131	43.150	90.630	90.709	88.982	90.335
132	43.217	90.618	90.688	88.971	90.324

Sample Number	TEST TIME	RTD 37 DEG F	RTD 38 DEG F	RTD 39 DEG F	RTD 40 DEG F
118	38.817	91.079	Deleted	89.486	90.738
119	39.150	91.025	Deleted	89.432	90.702
120	39.483	90.983	Deleted	89.390	90.649
121	39.817	90.947	Deleted	89.354	90.606
122	40.150	90.906	Deleted	89.305	90.557
123	40.483	90.864	Deleted	89.262	90.492
124	40.817	90.810	Deleted	89.208	90.456
125	41.150	90.785	Deleted	89.184	90.418
126	41.483	90.725	Deleted	89.132	90.364
127	41.817	90.694	Deleted	89.101	90.322
128	42.150	90.658	Deleted	89.054	90.283
129	42.483	90.629	Deleted	89.016	90.252
130	42.817	90.593	Deleted	88.989	90.214
131	43.150	90.550	Deleted	88.946	90.187
132	43.217	90.550	Deleted	88.946	90.178

CLRT Data

Sample Number	TEST TIME	RHD 1 % RH	RHD 2 % RH	RHD 3 % RH	RHD 4 % RH
118	38.817	62.01	71.04	70.78	80.33
119	39.150	62.19	71.13	70.89	80.39
120	39.483	62.35	71.27	71.04	80.13
121	39.817	62.53	71.39	71.21	80.30
122	40.150	62.73	71.52	71.37	80.07
123	40.483	62.92	71.66	71.50	80.12
124	40.817	63.08	71.75	71.67	80.11
125	41.150	63.28	71.89	71.88	79.89
126	41.483	63.42	71.98	71.96	79.83
127	41.817	63.64	72.11	72.12	79.90
128	42.150	63.76	72.23	72.22	79.81
129	42.483	63.95	72.33	72.37	79.48
130	42.817	64.14	72.46	72.54	79.73
131	43.150	64.38	72.67	72.77	79.56
132	43.217	64.42	72.70	72.86	79.65

Sample Number	TEST TIME	RHD 5 % RH	RHD 6 % RH	RHD 7 % RH	RHD 8 % RH
118	38.817	83.33	79.48	78.15	102.31
119	39.150	83.29	79.45	78.22	102.25
120	39.483	83.27	79.47	78.43	102.62
121	39.817	83.24	79.37	78.42	102.38
122	40.150	83.22	79.34	78.39	101.99
123	40.483	83.12	79.31	78.35	103.04
124	40.817	83.02	79.21	78.46	102.58
125	41.150	82.92	79.13	78.29	102.31
126	41.483	82.78	79.06	78.03	102.26
127	41.817	82.69	78.98	77.90	102.70
128	42.150	82.55	78.96	77.98	101.91
129	42.483	82.43	78.92	78.15	101.27
130	42.817	82.39	78.80	77.98	100.70
131	43.150	82.50	78.97	78.35	99.75
132	43.217	82.52	79.00	78.40	100.70

CLRT Data

TEST TIME	RHD 9 % RH	RHD 10 % RH
38.817	102.6	101.19
39.150	102.61	101.29
39.483	102.63	101.31
39.817	102.66	101.47
40.150	102.70	101.44
40.483	102.79	101.41
40.817	102.76	101.46
41.150	102.76	101.47
41.483	102.82	101.63
41.817	102.89	101.49
42.150	102.87	101.80
42.483	102.91	101.43
42.817	102.87	101.53
43.150	102.89	101.69
43.217	102.92	101.71

CLRT Data

Sample Number	TEST TIME	VAPOR PRESSURE PSIA	CONT. PRESSURE PSIA	AIR MASS	LEAK FIT %/DAY
118	38.817	0.6068	57.000	692753	
119	39.150	0.6062	56.994	692734	
120	39.483	0.6060	56.987	692694	
121	39.817	0.6054	56.981	692668	0.3152
122	40.150	0.6042	56.975	692657	0.2845
123	40.483	0.6048	56.969	692615	0.2924
124	40.817	0.6038	56.963	692595	0.2888
125	41.150	0.6027	56.957	692574	0.2827
126	41.483	0.6020	56.951	692552	0.2763
127	41.817	0.6018	56.945	692512	0.2787
128	42.150	0.6007	56.940	692502	0.2743
129	42.483	0.5989	56.934	692491	0.2666
130	42.817	0.5978	56.928	692471	0.2600
131	43.150	0.5970	56.923	692455	0.2534
132	43.217	0.5981	56.922	692433	0.2529

FITTED TOTAL TIME ILRT LEAKAGE RATE	Lam	=	-0.010 % /DAY
CONTAINMENT DESIGN LEAKAGE RATE	La	=	0.500 % /DAY
SUPERIMPOSED CLRT LEAKAGE RATE	Lo	=	0.264 % /DAY
FITTED CLRT TOTAL TIME LEAKAGE RATE	Lc	=	0.253 % /DAY

$$Lo + Lam - La/4 <= Lc <= Lo + Lam + La/4$$

$$0.264 +-0.010 - 0.125 <= 0.253 <= 0.264 +-0.010 + 0.125$$

$$0.129 <= 0.253 <= 0.379$$

CLRT Containment Absolute Pressure

St. Lucie Unit 2 1992

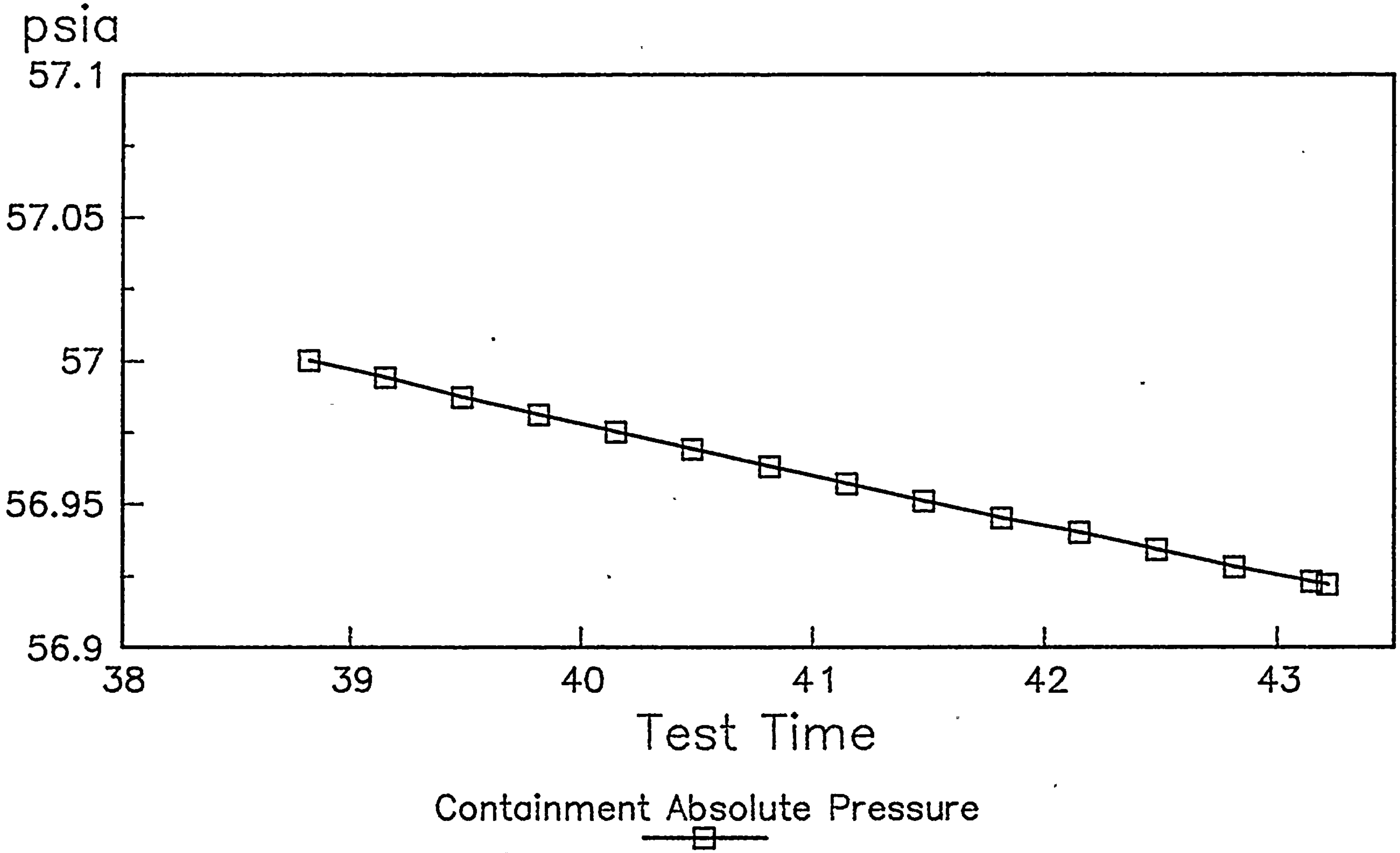


Figure S

CLRT Weighted Vapor Pressure

St. Lucie Unit 2 June 1992

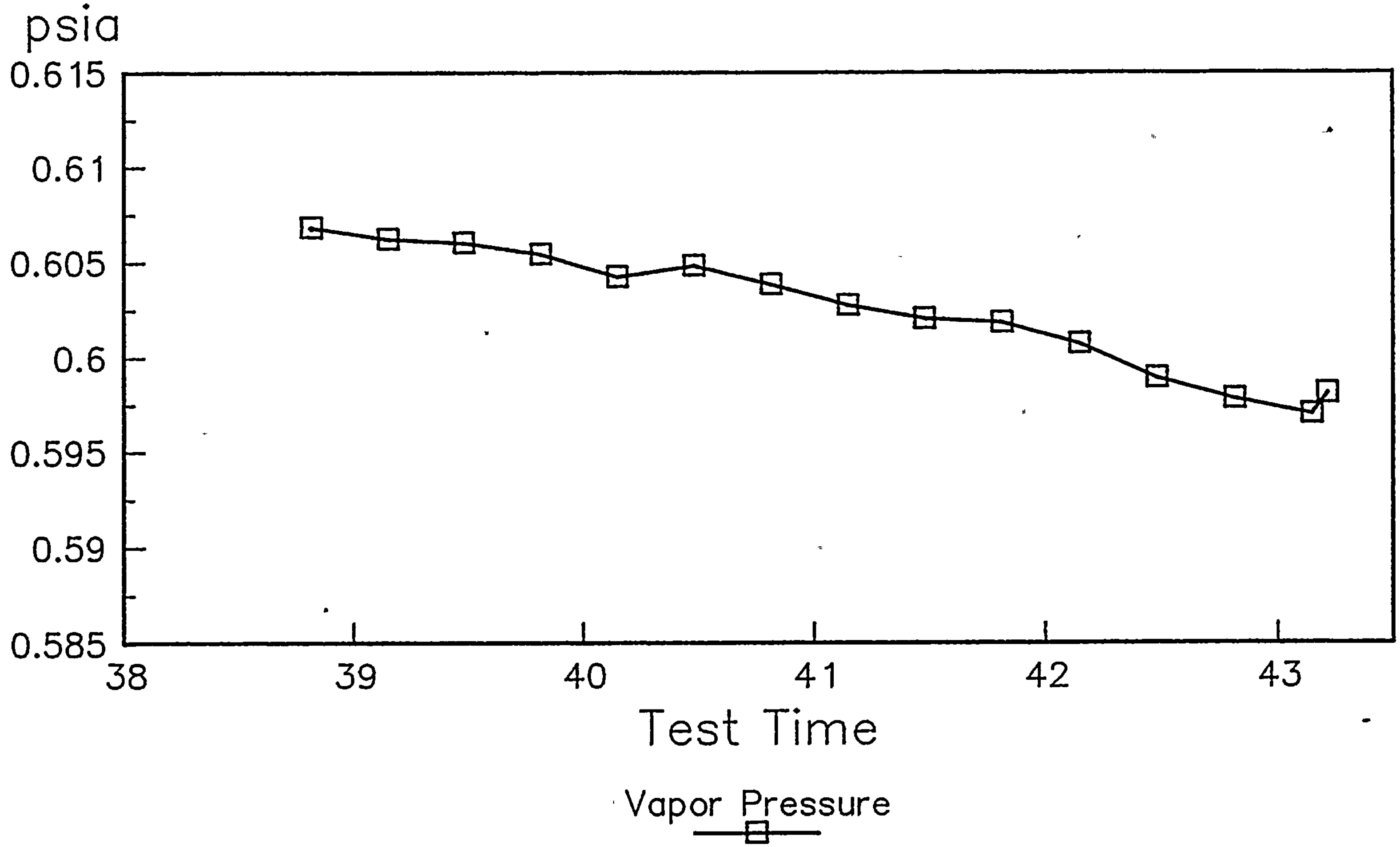


Figure T

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CLRT Weighted Average Temperature

St. Lucie Unit 2 June 1992

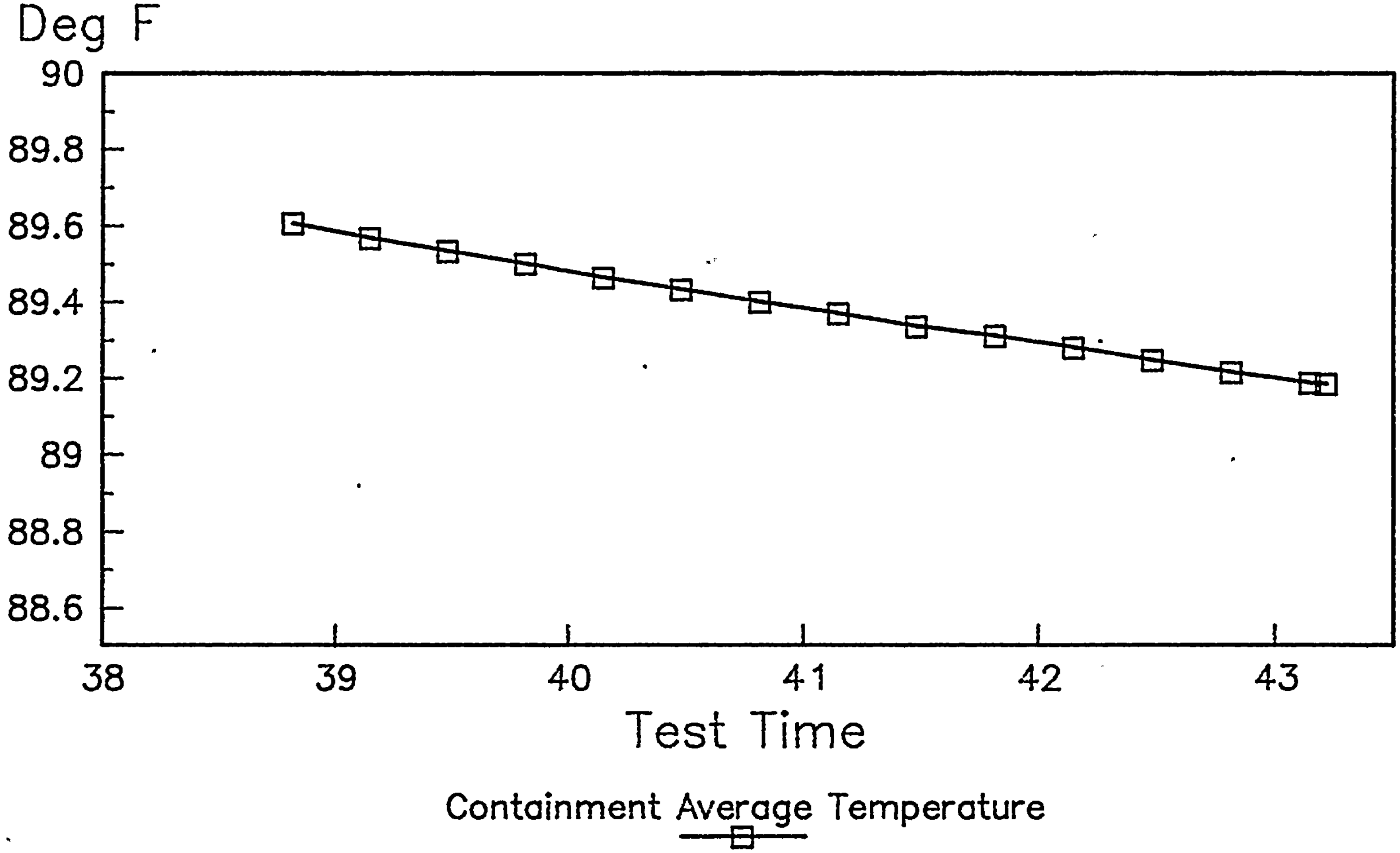


Figure U
105

CLRT Calculated Air Mass

St. Lucie Unit 2 June 1992

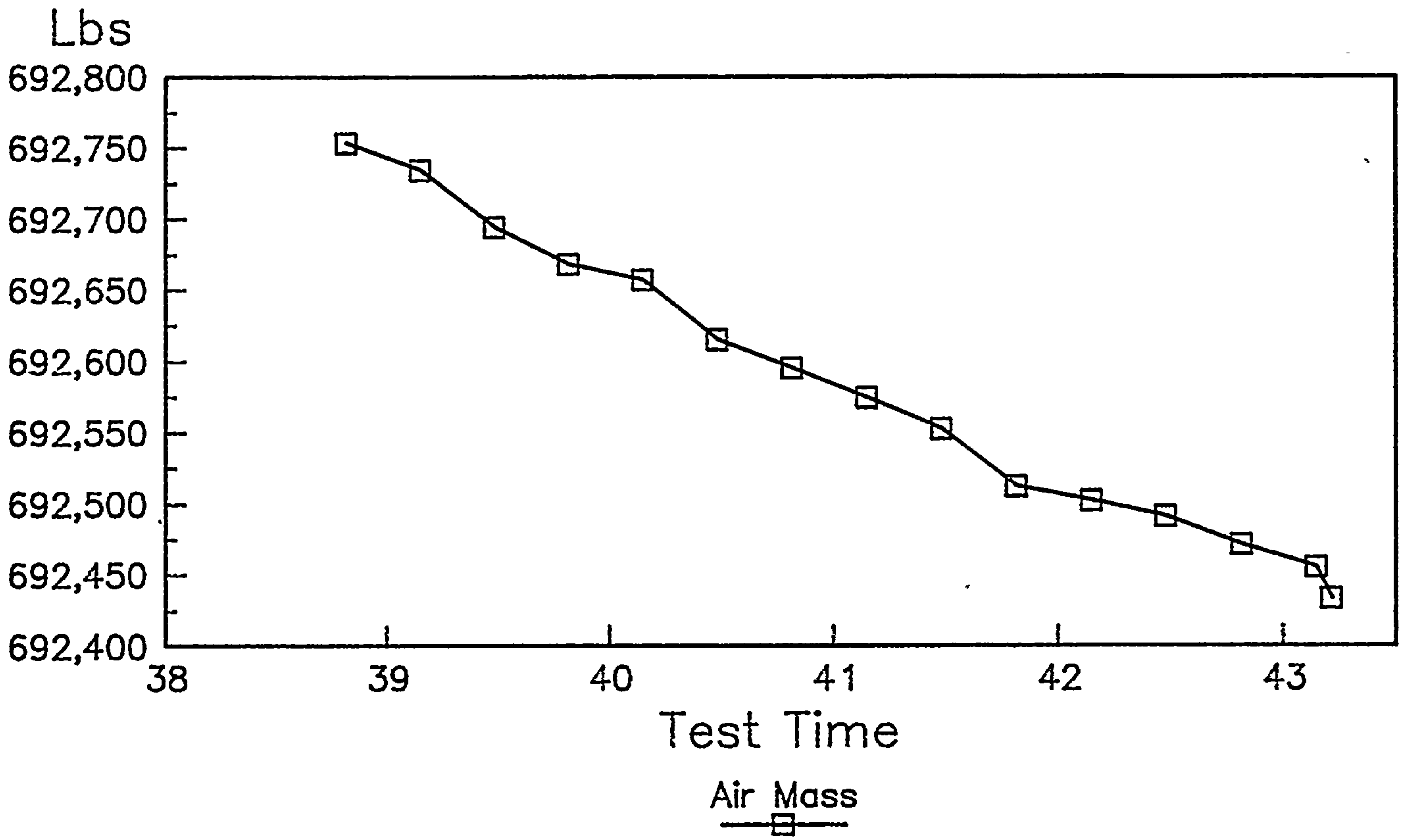
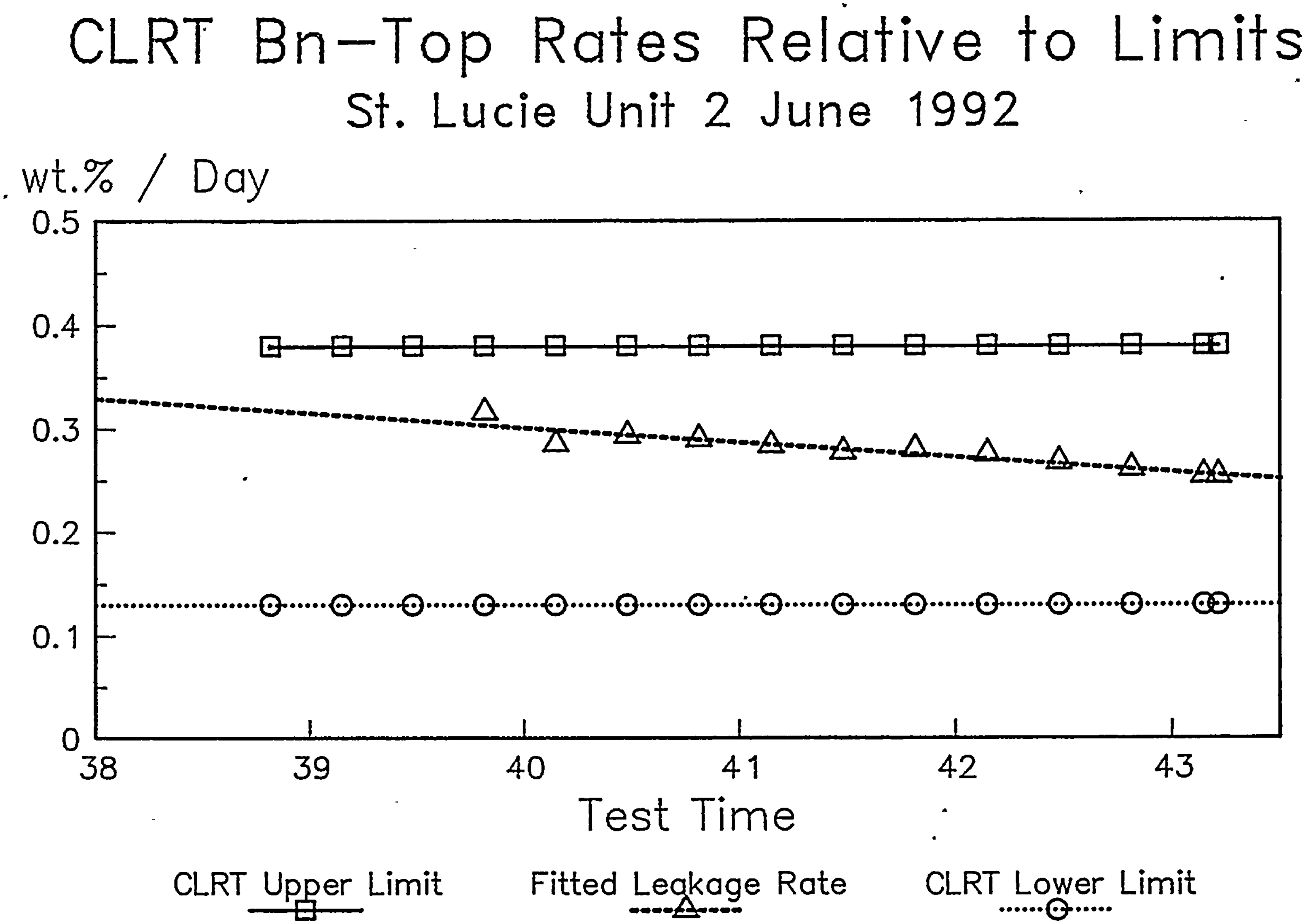


Figure V



CLRT Bn-Top Rates Relative to Limits
St. Lucie Unit 2 June 1992
wt.% / Day
0.5
0.4
0.3
0.2
0.1
0
38
39
40
41
42
43
Test Time
CLRT Upper Limit
Fitted Leakage Rate
CLRT Lower Limit

Figure W
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APPENDIX C
LOCAL LEAKAGE RATE TESTING CONDUCTED SINCE 1989

TYPE B TESTING BETWEEN REFUELING OUTAGES

SINCE 1989 REFUELING

DESCRIPTION	DATE	AS FOUND SCCM	AS LEFT SCCM	REMARKS
PERSONNEL AIR LOCK	09-11-89	46000	6500	See Section VI
	02-20-90	20000	20000	
	08/20/90	20000	20000	
	11-17-90	20000	20000	
	05-07-91	70000	37000	See Section VI
	10-31-91	57000	22000	See Section VI
	06-11-92	22000	17000	See Section VI
EMERGENCY ESCAPE HATCH	09-11-89	3000	3000	
	02-20-90	160	160	
	08-20-90	3000	3000	
	02-12-91	2000	2000	
	08-07-91	3000	3000	
	06-06-92	2000	2000	
Maintenance Hatch	01-12-90	20	20	

TYPE C TESTING BETWEEN REFUELING OUTAGES
SINCE 1989 REFUELING

DESCRIPTION	DATE	AS FOUND SCCM	AS LEFT SCCM	REMARKS
MAIN PURGE VALVES P-10 EXHAUST	06-05-89	3,171,840	200	See Section VI
	08-30-89	20	20	
	11-28-89	908,970	400	See Section VI
	01-05-90	2,500	2500	
	02-16-90	122,000	400	See Section VI
	03-29-90	60,000	400	See Section VI
	07-08-90	2200	2200	
	10-01-90	10,000	10,000	
	11-12-90	1500	1500	
	01-17-91	3000	3000	
	04-03-91	17.9	17.9	
	10-09-91	2800	2800	
	04-21-92	4500	4500	
	06-13-92	800	800	
P-11 INLET	06-05-89	20	20	
	08-30-89	20	20	
	11-28-89	20	20	
	02-15-90	20	20	
	08-15-90	20	20	
	10-01-90	20	20	
	01-17-91	9000	9000	
	07-01-91	300	300	
	01-07-92	20000	20000	
	04-22-92	600	600	
	06-11-92	200	200	

TYPE C TESTING BETWEEN REFUELING OUTAGES
SINCE 1989 REFUELING

DESCRIPTION	DATE	AS FOUND SCCM	AS LEFT SCCM	REMARKS
HYDROGEN PURGE VALVES P-56 INLET	06-06-89	400	400	
BYPASS LEAKAGE	08-28-89	250	250	
	11-27-89	700	700	
	02-21-90	820	820	
	05-16-90	880	880	
	08-15-90	800	800	
	11-20-90	5,000	5,000	
	02-07-91	8,400	8,400	
	05-22-91	9,600	9,600	
	08-06-91	10,900	10,900	
	11-08-91	20,000	20,000	
	02-04-92	20,000	20,000	
	06-13-92	600	600	
HYDROGEN PURGE VALVES P-57 EXHAUST	06-09-89	20	20	
BYPASS LEAKAGE	08-28-89	20	20	
	11-27-89	20	20	
	02-21-90	20	20	
	05-16-90	20	20	
	08-15-90	20	20	
	11-07-90	20	20	
	02-07-91	20	20	
	05-22-91	130	130	
	08-06-91	100	100	
	11-08-91	20	20	
	02-04-92	300	300	
	06-07-92	20	20	

TYPE C TESTING BETWEEN REFUELING OUTAGES

SINCE 1989 REFUELING

DESCRIPTION	DATE	AS FOUND SCCM	AS LEFT SCCM	REMARKS
P-48A H_2 Sample	08-22-89	20	20	Replace FSE-27-10
P-26 Letdown	01-06-90	55	25	Repack V2516

REFUELING OUTAGE TYPE B TESTING
SINCE 1989 REFUELING

1990 REFUELING

PEN. NO.	TYPE SERVICE	VALVE NO.	DATE	AS FOUND SCCM MIN.PATH	AS LEFT SCCM MIN.PATH	AS FOUND SCCM MAX.PATH	AS LEFT SCCM MAX.PATH	REMARKS
1	MAIN STEAM BELL 2A	TAP #1 TAP #2	10-03-90	20	20	20	20	
2	MAIN STEAM BELL 2B	TAP #1 TAP #2	10-03-90	35	35	35	35	
3	FEEDWATER BELL 2A	TAP #1 TAP #2	10-03-90	20	20	20	20	
4	FEEDWATER BELL 2B	TAP #1 TAP #2	10-03-90	20	20	20	20	
25	FUEL TRANS BELL FUEL TRANS TUBE	TAP #1 FLANGE O-RING	10-12-90 10-04-90	20 20	20 90	20 20	20 90	
50	OUTAGE AUX PEN	BLANK FLANGES	11-09-87	20	20	20	20	
	MAINT HATCH	GASKET INTER-SPACE	10-01-90	20	20	20	20	
A-1 THRU E-10	ELEC. PEN.	NA	09-29-87	6125	6195	6125	6195	
TOTAL TYPE B LEAKAGE (SCCM)				6300	6370	6300	6370	

REFUELING OUTAGE TYPE C TESTING
SINCE 1989 REFUELING

1990 REFUELING

PEN. NO.	TYPE SERVICE	VALVE NO.	DATE	AS FOUND SCCM MIN.PATH	AS LEFT SCCM MIN.PATH	AS FOUND SCCM MAX.PATH	AS LEFT SCCM MAX.PATH	REMARKS
7	PRIMARY MAKEUP WATER	V-15-328 HCV-15-1	10-03-90	20	20	3000	3000	BYPASS
8	STATION AIR	HCV-18-2 V-18-1270 SH-18-797	10-1-90	1000	1000	4800	4800	BYPASS
9	INSTRUMENT AIR	V-18-195 HCV-18-1	11-03-90	270	270	600	600	BYPASS
14	NITROGEN SUPPLY	V-6792 V-6741	10-12-90	20	20	35.7	35.7	BYPASS
23	RCP COOLING	HCV-14-1 HCV-14-7	10-26-90	20	20	20	20	BYPASS
24	RCP COOLING	HCV-14-2 HCV-14-6	10-26-90	20	20	20	20	BYPASS
26	LETDOWN LINE	V-2516 V-2522	11-08-90	20	20	200	1500	BYPASS
28A	SIT SAMPLE	I-SE-05-1A I-SE-05-1B I-SE-05-1C I-SE-05-1D I-SE-05-1E	10-10-90	20	20	80	80	BYPASS
28B	HOT LEG SAMPLE	V-5200 V-5203	10-05-90	20	20	30	30	BYPASS
29A	PRESS SAMPLE	V-5201 V-5204	10-08-90	20	20	55	55	BYPASS
29B	PRESS SAMPLE	V-5202 V-5205	10-05-90	20	20	200	200	BYPASS
31	RCB VENT HEADER	V-6718 V-6750	10-11-90	155	155	200	200	BYPASS
41	SIT TEST LINE	I-SE-03-2A & I-SE-03-2B V-3463	10-05-90	300	300	300	300	BYPASS
42	CONT SUMP	LCV-07-11A LCV-07-11B	10-05-90	20	20	45	45	BYPASS
43	RDT PUMP SUCT	V-6341 V-6342	11-12-90	740	740	20000	200	BYPASS
44	RCP BLEED-OFF	V-2524 V-2505	10-05-87	20	20	20	20	BYPASS
46	FUEL POOL CLEANUP	V-7189 V-7206	10-05-90	20	20	100	100	BYPASS
47	FUEL POOL CLEANUP	V-7188 V-7170	10-05-90	70	20	150	150	BYPASS

REFUELING OUTAGE TYPE C TESTING
SINCE 1989 REFUELING

1990 REFUELING

PEN. NO.	TYPE SERVICE	VALVE NO.	DATE	AS FOUND SCCM MIN.PATH	AS LEFT SCCM MIN.PATH	AS FOUND SCCM MAX.PATH	AS LEFT SCCM MAX.PATH	REMARKS
48A	H2 SAMPLE	FSE-27-8 FSE-27-9 FSE-27-10 FSE-27-11 FSE-27-15	10-03-90	20	20	80	80	
48B	H2 SAMPLE	V-27-101 FSE-27-16	10-03-90	20	20	550	500	
51A	H2 SAMPLE	FSE-27-12 FSE-27-13 FSE-27-14 FSE-27-18	10-03-90	20	20	60	60	
51B	H2 SAMPLE	V-27-102 V-27-17	10-03-90	20	20	2800	2800	
52A	RCB ATMOS RAD MONITORS	FCV-26-1 FCV-26-2	10-10-90	65	65	550	550	BYPASS
52B	RCB ATMOS RAD MONITORS	FCV-26-3 FCV-26-4	10-10-90	110	110	120	120	BYPASS
52C	RCB ATMOS RAD MONITORS	FCV-26-5 FCV-26-6	10-10-90	20	20	250	250	BYPASS
52D	ILRT TEST CONNECTION	V-00140 V-00143	10-24-90	35	35	320	320	BYPASS
52E	ILRT TEST CONNECTION	V-00139 V-00144	10-24-90	20	20	20	20	BYPASS
54	ILRT TEST CONNECTION	V-00101	10-03-90	3500	3500	3500	3500	BYPASS
67	CONTAINMENT VACUUM RELIEF	V-25-20 FCV-25-7	10-23-90	20	20	300	300	
68	CONTAINMENT VACUUM RELIEF	V-25-21 FCV-25-8	10-25-90	20	20	20	20	
TOTAL TYPE C LEAKAGE				6645	6645	38,426	19,875	
TOTAL BYPASS TYPE LEAKAGE (SCCM)				6525	6525	34,616	16,115	

REFUELING OUTAGE TYPE B TESTING
SINCE 1989 REFUELING

1992 REFUELING

PEN. NO.	TYPE SERVICE	VALVE NO.	DATE	AS FOUND SCCM MIN.PATH	AS LEFT SCCM MIN.PATH	AS FOUND SCCM MAX.PATH	AS LEFT SCCM MAX.PATH	REMARKS
1	MAIN STEAM BELL 2A	TAP #1 TAP #2	5-22-92	20	20	20	20	
2	MAIN STEAM BELL 2B	TAP #1 TAP #2	5-22-92	20	20	20	20	
3	FEEDWATER BELL 2A	TAP #1 TAP #2	5-22-92	20	20	20	20	
4	FEEDWATER BELL 2B	TAP #1 TAP #2	5-22-92	20	20	20	20	
25	FUEL TRANS BELL	TAP #1	5-22-92	20	20	20	20	
	FUEL TRANS TUBE	FLANGE O-RING	4-28-92	20	20	20	20	
50	OUTAGE AUX PEN	BLANK FLANGES	4-23-92	38	20	75	20	
	MAINT HATCH	GASKET INTER-SPACE	4-22-92	20	20	20	20	
A-1 THRU E-10	ELEC. PEN.	NA	4-28-92	7800	7800	7800	7800	
TOTAL TYPE B LEAKAGE				7978	7960	8015	7960	

REFUELING OUTAGE TYPE C TESTING
SINCE 1989 REFUELING

1992 REFUELING

PEN. NO.	TYPE SERVICE	VALVE NO.	DATE	AS FOUND SCCM MIN.PATH	AS LEFT SCCM MIN.PATH	AS FOUND SCCM MAX.PATH	AS LEFT SCCM MAX.PATH	REMARKS
7	PRIMARY MAKEUP WATER	V-15-328 HCV-15-1	4-27-92	400	400	2800	2800	BYPASS
8	STATION AIR	SH-18-797 HCV-18-2 V-18-1270	6-13-92	1300	1300	16,000	1300	BYPASS
9	INSTRUMENT AIR	V-18-195 HCV-18-1	6-11-92	650	650	900	900	BYPASS
14	NITROGEN SUPPLY	V-6792 V-6741	4-25-92	20	20	50	50	BYPASS
23	RCP COOLING	HCV-14-1 HCV-14-7	5- 1-92	20	20	980	20	BYPASS
24	RCP COOLING	HCV-14-2 HCV-14-6	5-19-92	20	20	20	20	BYPASS
26	LETDOWN LINE	V-2516 V-2522	6-12-92	20	50	20	60	BYPASS
28A	SIT SAMPLE	I-SE-05-1A I-SE-05-1B I-SE-05-1C I-SE-05-1D I-SE-05-1E	6-14-92	40	20	185	20	BYPASS
28B	HOT LEG SAMPLE	V-5200 V-5203	4-24-92	20	20	60	60	BYPASS
29A	PRESS SAMPLE	V-5201 V-5204	6-12-92	20	20	20	90	BYPASS
29B	PRESS SAMPLE	V-5202 V-5205	4-27-92	20	20	500	500	BYPASS
31	RCB VENT HEADER	V-6718 V-6750	4-27-92	20	20	20	20	BYPASS
41	SIT TEST LINE	I-SE-03-2A & I-SE-03-2B V-3463	4-27-92	20	20	20	20	BYPASS
42	CONT SUMP	LCV-07-11A LCV-07-11B	4-27-92	20	20	70	70	BYPASS
43	RDT PUMP SUCT	V-6341 V-6342	5-21-92	350	350	400	400	BYPASS
44	RCP BLEED-OFF	V-2524 V-2505	5-20-92	20	20	20	20	BYPASS
46	FUEL POOL CLEANUP	V-7189 V-7206	4-25-92	20	20	20	20	BYPASS
47	FUEL POOL CLEANUP	V-7188 V-7170	4-25-92	20	20	20	110	BYPASS

REFUELING OUTAGE TYPE C TESTING
SINCE 1989 REFUELING

1992 REFUELING

PEN. NO.	TYPE SERVICE	VALVE NO.	DATE	AS FOUND SCCM MIN.PATH	AS LEFT SCCM MIN.PATH	AS FOUND SCCM MAX.PATH	AS LEFT SCCM MAX.PATH	REMARKS
48A	H2 SAMPLE	FSE-27-8 FSE-27-9 FSE-27-10 FSE-27-11 FSE-27-15	5- 5-92	20	20	80	80	
48B	H2 SAMPLE	V-27-101 FSE-27-16	5- 5-92	20	20	3000	3000	
51A	H2 SAMPLE	FSE-27-12 FSE-27-13 FSE-27-14 FSE-27-18	5- 5-92	20	20	60	60	
51B	H2 SAMPLE	V-27-102 V-27-17	5- 5-92	20	20	500	500	
52A	RCB ATMOS RAD MONITORS	FCV-26-1 FCV-26-2	5- 1-92	950	950	1200	1200	BYPASS
52B	RCB ATMOS RAD MONITORS	FCV-26-3 FCV-26-4	5- 1-92	110	110	130	130	BYPASS
52C	RCB ATMOS RAD MONITORS	FCV-26-5 FCV-26-6	5- 1-92	20	20	160	160	BYPASS
52D	ILRT TEST CONNECTION	V-00140 V-00143	5- 6-92	100	100	300	300	BYPASS
52E	ILRT TEST CONNECTION	V-00139 V-00144	5- 6-92	20	20	100	100	BYPASS
54	ILRT TEST CONNECTION	V-00101	04-24-92	900	900	1800	1800	BYPASS
67	CONTAINMENT VACUUM RELIEF	V-25-20 FCV-25-7	6- 6-92	40	40	350	20	
68	CONTAINMENT VACUUM RELIEF	V-25-21 FCV-25-8	04-24-92	20	20	200	200	
TOTAL TYPE C LEAKAGE				5240	5240	29,985	14,030	
TOTAL BYPASS TYPE LEAKAGE				5100	5100	25,795	25,465	

VI. LOCAL LEAKAGE RATE PROBLEMS SINCE LAST ILRT

A. Main Purge Exhaust (FCV-25-5)

During routine testing on June 5, 1989 FCV-25-5 (48" butterfly valve on main purge exhaust P-10) was found to be leaking in excess of the Technical Specification limits, see LERs 389-89-004, 389-89-009, and 389-89-009 Rev1. Improper adjustment of valve closure stop was originally thought to be the cause of the excessive leakage. On November 28, 1989 the valve again failed LLRT. After adjusting the valve closure stop again to stop leakage the testing frequency was increased. After another LLRT failure a blind flange was installed per Engineering Safety Evaluation JPN-PSL-SEMJ-90-039. Because the flange is outside the shield building this makes leakage from this penetration now bypass leakage, and plant procedures were changed to correctly account for the Technical Specification limit on bypass leakage. During the 1990 refueling outage repair and root cause determination was not done due to personnel safety concerns over performing maintenance on the 48 inch butterfly valve without a jacking device for the actuator available to hold the valve open. An Engineering Request has been submitted to make the blind flange permanent.

B. Personnel Air Lock

Between the 1989 and 1992 refueling outage the personnel air lock exhibited high leakage during the "overall leakage test" (strong-back test) of Tech Spec 4.6.1.3.b on September 20, 1990. The air lock was repaired by replacing the outer door reach rod shaft packing. Reducing the overall leakage from 46,000 sccm to 6,500 sccm, the limit being 47,250 sccm. After successful tests on February 20, 1990, August 20, 1990, and November 17,1990, the personnel airlock failed the strong back test on May 7, 1991. Repairs were again made to reach rod shaft seals before the Limiting Condition for Operation (LCO) 3.6.1.3 time limit was exceeded. Similar problems were experienced after the 1990 refueling on October 31, 1991. During the 1992 refueling outage (prior to the ILRT) the reach rod shafts were rebuilt and seal again replaced.